# Modbus Communication Option

Micrologic A, E, P and H

User manual

Merlin Gerin
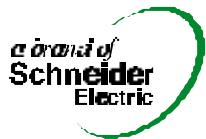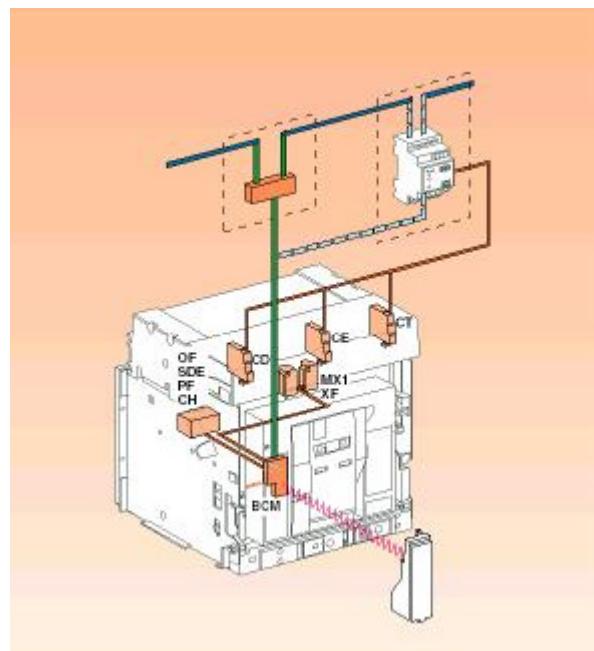
This document presents the architecture and the functions of the Modbus communication option.

The Modbus communication option makes it possible to remotely use all the functions of your Masterpact or Compact circuit breaker, its Micrologic control unit and all the pertaining options. Remote operations are based on a secure communication architecture.
The Modbus communication option may be used to interconnect the control units (A , E , P or H) and a supervisor, a PLC or Modbus master equipment. The connection implements an RS485 physical link and the Modbus -RTU protocol.

To install and connect the system, see the corresponding documentation.

Modbus communication option for Micrologic A , E, and H

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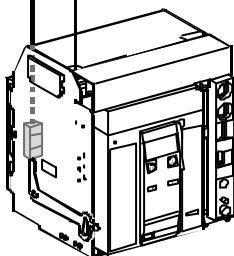
Connection of a fixed circuit breaker requires one connection point on the RS485 bus for the "device" communication module which is installed behind the Micrologic control unit.
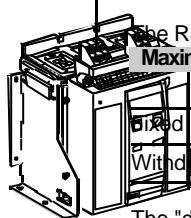
Connection of a withdrawable circuit breaker requires two connection points on the RS485 bus, one for the "device" communication module and the second for the "chassis" communication module.

The RS485 standard limits the number of physical connections per segment to 32

Maximum number of circuit breakers	
	Per RS485 segment
Fixed	31
Withdrawable	15

Withdrawable   **Fixed**

The "device" communication module contains three managers:
b the circuit-breaker manager
b the metering manager
b the protection manager.

The "chassis" communication module contains the chassis manager.

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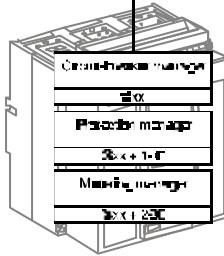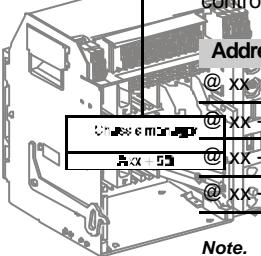
The division into four separate managers enhances the security of data exchange between the supervision system and the circuit-breaker actuators.

The manager addresses are automatically inferred from the @xx address entered on the Micrologic control unit. By default, the circuit-breaker manager address is **47**.

Addresses	
@ xx	Circuit-breaker manager
@ xx + 50	Chassis manager
@ xx + 200	Metering manager
@ xx + 100	Protection manager

Note.
For information on setting the control-unit address, see the installation manual for the equipment.

Device   **Chassis**

Manager architecture

b A manager contains:
a table of registers that may be read-accessed only
files such as the event log
commands for functions such as write in the registers, turn the circuit breaker ON or OFF, reset counters, etc
Modbus functions used to remotely access the registers and the manger files.

Note.
The commands for the metering and protection managers are controlled by the circuit-breaker manager.

b A command interface in the circuit-breaker and chassis managers is used to control the applications.
This interface monitors execution of the command and issues a report.

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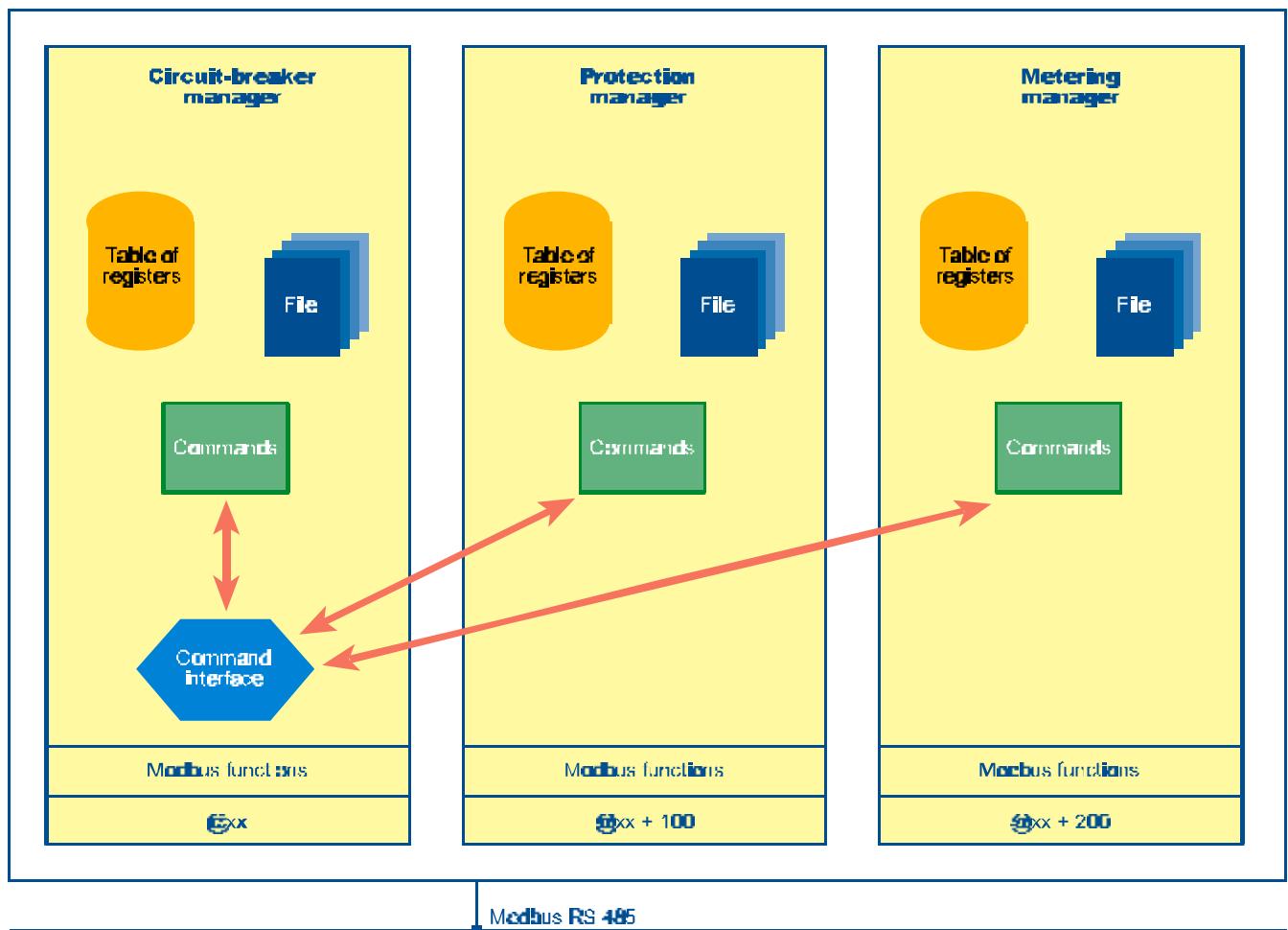
Modbus functions

The device and chassis Modbus options operate in slave mode and enable a Modbus master to access all the registers, files and applications contained in the managers.

Circuit-breaker manager: @ xx

The circuit-breaker manager may be used to remotely monitor circuit-breaker status:

b open (OFF)
b closed (ON)
b tripped (SDE)
b ready to close (PF), etc.

It is also possible to remotely open or close the circuit breaker if the MX and/or XF communicating coils are installed.

Remote control may be disabled by locally setting the Micrologic control unit to manual ("Manu") mode. "Auto" mode enables remote control of the circuit breaker.

The circuit-breaker manager contains the registers listed below.

Register range	Description
515-543	Modbus configuration and identification
544-577	Diagnostics counters and Modbus password
603-624	Metering/protection manager event notification
650-670	Tripping cause and circuit-breaker status
671-715	Time-stamping of last status changes
718-740	Event log in the circuit-breaker manager (see the section : Access to the files)
800	Communication profile activation
1200-12215	Communication profile

Note.
*More detailed information on these registers is presented in thesection Appendix : **Table of registers** : circuit-breaker -manager.*
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Communication profile
In order to optimize the number of Modbus request, a communication profile has been implemented. The communication profile is located in the circuit-breaker manager **@xx**. This communication profile contains informations coming from the circuit-breaker manager, the metering manager and the Protection manager. The communication profile is defined in the register range : 12000-12215.

Simplified OPEN/CLOSE command
In order to simplify the application software to remotely open or close the circuit-breaker, a simplified OPEN/CLOSE command has been implemented. The simplified OPEN/CLOSE command is located in the circuit-breaker manager **@xx**. With the simplified OPEN/CLOSE command, it is not necessary to request the flag, neither to enter in configuration mode, neither to read the control word. It is still necessary to be in AUTO mode (see register 670). Furthermore, this simplified OPEN/CLOSE command is password protected (default value=0000). In order to change the password, it is mandatory to use the « magic box » and the associated Micrologic utility RSU.(please consult us).
The simplified OPEN/CLOSE command is a share command (command code = 57400).
Note.
*More detailed information on this command is presented in thesection Appendix : **Liste of command** : circuit-breaker -manager.*

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WARNING :   Communication profile and simplified OPEN/CLOSE command are available only with a Breaker Communication Module firmware version greater or equal to V2.0 (register 577 must be greater or equal to 02000)

The chassis manager indicates the position of the device on the chassis:
b "connected" position
b "test" position
b "disconnected" position.

The chassis manager contains the registers listed below.

Register range	Description
515-543	Modbus configuration and identification
544-577	Diagnostics counters and Modbus password
661-664	Chassis status
679-715	Time-stamping of last status changes

Note.
More detailed information on these registers is presented in thesection Appendix : **Table of registers** *: chassis-manager.*
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Metering manager:
@ xx + 200

The metering manager prepares the electrical values used to manage the low-voltage distribution system.

Every second, the metering manager refreshes the "real-time" rms measurements. Using this data, it then calculates the demand and energy values, and stores the minimum / maximum values recorded since the last reset.

Metering-manager operation depends on the Micrologic settings:
b type of neutral (internal, external, none)
b the normal direction for the flow of active power (this setting determines the sign of the measured power).
b voltage-transformation ratio
b rated frequency.

The metering manager must be set independently of the protection manager to determine:
b the calculation mode for the power (type of distribution system)
b the calculation mode for the power factor (IEEE, IEEE alt., IEC)

The metering manager contains the registers listed below.

Register range	Description
1000-1299	Real-time measurements
1300-1599	Minimum values for the real-time measurements from 1000 to 1299
1600-1899	Maximum values for the real-time measurements from 1000 to 1299
2000-2199	Energy
2200-2299	Demand values
3000-3299	Time stamping
3300-3999	Configuration of the metering manager
4000-4099	Reserved
4100-5699	Spectral components
5700-6899	Analog pre-defined alarm (1 to 53)
7100-7499	File Header/ status (see the section : Access to the files)

Note.
*More detailed information on these registers is presented in thesection Appendix : **Table of registers** : metering-manager.*

Registers 1000 to 1299: real-time measurements

The metering manager refreshes the real-time measurements every second.

Registers 1300 to 1599: minimum values of the real-time measurements from 1000 to 1299

The minimum values for the real-time measurements may be accessed at the registers of the real-time values + 300.

All the minimum values are stored in memory and may be reset to zero, group by group according to the list below, by the command interface:
b rms current
b current unbalance
b rms voltage
b voltage unbalance
b frequency
b power
b power factor
b fundamental
b total harmonic distortion
b voltage crest factor
b current crest factor.

Note.
The minimum and maximum values of the real-time measurements are stored in the memory.
They may be reset to zero.
The maximum values of the demand measurements are time stamped and stored in memory.
They may be reset to zero.

Registers 1600 to 1899: maximum values of the real-time measurements from 1000 to 1299

The maximum values for the real-time measurements may be accessed at the registers of the real-time values + 600.

All the maximum values are stored in memory and may be reset to zero, group by group according to the list below, by the command interface:
b rms current
b current unbalance
b rms voltage
b voltage unbalance
b frequency
b power
b power factor
b fundamental
b total harmonic distortion
b voltage crest factor
b current crest factor.

Registers 2000 to 2199: energy measurements

The energy counters may be:
b reset to zero
b preloaded with an initial value
using the reset applications via the command interface.

Registers 2200 to 2299: demand values

The demand values are refreshed every 15 seconds for sliding windows or at the end of the time interval for block windows. When block windows are used, an estimation of the value at the end of the time interval is calculated every 15 seconds.

Registers 3000 to 3299: time stamping

The time-stamping function becomes useful once the time and date have been set on the Micrologic control unit, either locally or via the communication network.
If power to the Micrologic control unit unit is cut, the time and date must be set again. With firmware release "logic 2002 AA" and above, the clock is powered by the battery. So, it is no more necessary to set time and date after power comes off on the Micrologic control unit.
If power to the communication option is cut, the time and date must be set again
The maximum drift of the Micrologic clock is approximately 0,36 seconds per day.
To avoid any significant drift, the clocks must be periodically synchronised via the communication network.

Registers 3300 to 3999: configuration of the metering manager

The configuration registers may be read at all times. The registers may be modified via the command interface in configuration mode.

Registers 4100 to 5699: spectral components

b rms/phase of voltage harmonic
b rms/phase of current harmonic.

Registers 6000 to 6899: Analog pre-defined Alarms (1 to 53)

The alarms registers may be read at all times. The registers may be modified via the command interface in configuration mode. These alarms (available with Micrologic H only) can be used to trigger Wave form Capture.

Registers 7100 to 7499: File header/Status

Event log configuration/characteristics and format of records for :
Wave Form Capture   (file n° 5)
Event log of the metering manager   (file n° 10)
Min-Max event log   (file n° 11)
Maitenance event log of the metering manager   (file n° 12)

Protection manager:
@ xx + 100

The protection manager ensures the critical circuit-breaker functions. The Micrologic control unit was designed to make this manager completely independent and thus guarantee secure operation.

It does not use the measurements generated by the metering manager, but rather calculates the protection-function inputs and outputs itself. This ensures extremely fast reaction times.

The protection manager manages:
b The basic protection : the long-time (LT), short-time (ST), instantaneous and ground-fault current protection functions
b The advanced protection : currents I max, I unbal, voltages U max, U min and U unbal, frequency F max and F min, maximum reverse power Rp max, phase rotation $\Delta\Phi$.

The protection manager controls:
b the automatic load shedding and reconnection functions, depending on current and power
b the optional M2C and M6C contacts.

Remote access to the protection manager depends on the parameters set locally on the Micrologic control unit and on the position of the protective cover for the settings.

A local operator may disable all remote access to the protection manager. It is also possible to limit access to certain users by setting up a password on the Micrologic control unit.

A protection function intended to trip the circuit breaker cannot be modified if the protective cover is closed, with or without the password.

The protection manager contains the registers listed below.

Register range	Description
8750-8753	Characteristics of the protection manager
8754-8803	Fine settings for the long-time, short-time, instantaneous, ground-fault and earth-leakage protection functions
8833-8842	Measurements carried out by the protection manager
8843-8865	Status of the protection manager
9000-9599	Time stamping and trip/alarm history
9600-9628	Micrologic configuration
9629-9799	Advanced protection settings
9800-9899	Relay configuration (M2C/M6C)
9900-9924	Event log (see the section : Access to the files) File N° 20
9932-9956	Maintenance event log (see the section : Access to the files) File N° 12
9964-9989	Fault Wave form Capture(see the section : Access to the files) File N° 22

Note.
*More detailed information on these registers is presented in thesection Appendix : **Table of registers** : protectiong-manager.*
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Operating principle

Write access to Micrologic data and control-unit options is monitored to inhibit accidental operation and operation by unauthorised persons.

Commands sent to Micrologic control units are carried out via a command interface.

The command interface manages transmission and execution of the various commands using the registers numbered from 7700 to 7729 that may be accessed by the Modbus read and write functions.

The circuit-breaker manager supports the command interface for the commands intended for the circuit-breaker, measurement and protection managers.

The chassis manager supports its own command interface.

Slave @ xx [circuit-breaker manager]	Slave @ xx+50 [chassis manager]
Command interface 7700 to 7729	**Command interface 7700 to 7729**
Commands intended for the circuit-breaker manager	Commands intended for the chassis manager only
Commands intended for the protection manager	
Commands intended for the metering manager	

The command interface offers two command-management modes:
b shared mode
This mode may be used to send up to 20 commands in series. It returns exclusively the indications on command transmission via the Modbus protocol. This mode does not return the result of command execution.
b protected mode
This mode may be used to monitor execution of a command and to manage access by a number of supervisors to a single circuit breaker. This is the case for the Modbus multi-master architectures on Ethernet TCP/IP).

When a command is written, the command interface updates its registers with information on command execution. **It is necessary to wait until the command is terminated before sending the next command**.(Recommanded time-out is 500 ms)
Furthermore, when the command is terminated, it is necessary to respect a delay before sending the next command. (Recommanded delay is 20 ms).

Access control is achieved by a flag reservation and freeing mechanism. In protected mode, a command may be issued only after receiving a flag.

Note.
Certain commands may be accessed only in protected mode. See the section with the list of commands to determine the possible command-management modes.

Command interface registers

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7700	10	R/W	-	-	INT	0.. 65535	A/E	P/H	command interface in shared mode – commands [1],	ShCmdIf
7715	5	R	-	-	INT	0.. 65535	A/E	P/H	command interface in protected mode – status [1]	PrCmdIfState
7720	10	R/W	-	-	INT	0.. 65535	A/E	P/H	command interface in protected mode – commands [1],	PrCmdIf
7730	100	R	-	-	INT	0.. 65535	A/E	P/H	command interface in protected mode – return data[1],	PrCmdIfBuffer

[1] *See the section " List of commands ".*

Send commands in shared mode

The shared mode uses the registers numbered 7700 to 7709 in the command interface:
Command interface registers 7700 to 7709 may be read accessed. They are used to send parameters and run execution of commands in shared mode.

Registers	Description
7700	Command number
7701	Parameter P1
7702	Parameter P2
7703	Parameter P3
7704	Parameter P4
7705	Parameter P5
7706	Parameter P6
7707	Parameter P7
7708	Parameter P8
7709	Parameter P9

See the list of commands that may be accessed in shared mode and the corresponding parameters in the section with the list of commands for Micrologic control units.

Proceed in the following manner to send a command in shared mode.
b Step 1. **Parameters**
 Fill in the command parameters in registers 7701 to 7709
b Step 2. **Write command**
Write the command number to register 7700 to initiate execution.

It is possible to optimise data flow on the communication system by using function 16 in the Modbus protocol. In this case, the data may be written to registers 7700 to 7709 in a single step. The circuit-breaker communication option will automatically put steps 1 and 2 in the correct order.

Send commands in protected mode

The protected mode uses the registers numbered 7715 to 7829 in the command interface.

Command interface registers 7715 to 7719 may be read accessed only and provide the indications required to use the protected mode (status).

Registers	Description
7715	Flag query [1]
7716	Active Flag [2]
7717	Number of the command being executed [3]
7718	Number of the last command executed [4]
7719	Result code of the last command executed [4]

Note.
[1] *Register 7715 must be read-accessed to request an access flag to the command interface in protected mode. The communication option returns 0 if the flag was already attributed during a previous query and not returned (see the command table for information on return). Otherwise, a random number is read, corresponding to the flag attributed. This number becomes the active flag.*

[2] *The active flag indicates to a supervisor the number of the flag with current access rights to the command interface in protected mode. Only the supervisor that was attributed the given number during a flag query has the right to use the command interface in protected mode. The active flag returns to 0 if no command is sent for two minutes or if the user returns the flag (see the command table for information on return).*

[3] *The number of the command currently being executed remains set to 0 as long as no command is sent to 7720. As soon as a command is sent, register 7717 indicates the number of the command. It returns to 0 when command execution is terminated.*

[4] *When command execution is terminated, register 7718 receives the number of the command and register 7719 indicates the result code. The contents of registers 7718 and 7719 are not modified until the next command has been completely executed.)*

Register 7719 : Command result codes table

Result codes	Description of register 7719
0	Command successfully executed.
10	Command not executed, the necessary resources are not available or the option is not installed.or remote access = NO
11	Command not executed, a local user is using the resources.
12	Command not executed, the portable test kit is using the local resources.
14	Command not executed, the resources are being used by a remote user.
15	Invalid record size.
16	Illegal file command.
17	Insufficient memory.
42	Invalid file number.
81	Command not defined.
82	Command parameters not set or invalid.
107	Invalid record number.
125	Invalid number of records.
200	Protected mode not active.
201	End of time delay. Command not executed.
202	Invalid password. Command not executed.

Send commands in protected mode

Command interface registers 7720 to 7729 may be read accessed. They are used to send parameters and run execution of commands in protected mode.

Registers	Description
7720	Command number
7721	Parameter P1
7722	Parameter P2
7723	Parameter P3
7724	Parameter P4
7725	Parameter P5
7726	Parameter P6
7727	Parameter P7
7728	Parameter P8
7729	Parameter P9

See the list of commands that may be accessed in protected mode and the corresponding parameters in the section with the list of commands for Micrologic control units.

Command interface registers 7730 to 7829 may be read accessed. They are used as a buffer for the returned data.

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Send commands in protected mode

Proceed as follows to send a command in protected mode.

b Step 1. **Request the flag**
Read register 7715 to request the flag required to access the protected mode.
If the register returns 0, another user currently has the access rights and it is necessary to wait until that user returns the flag. It is possible, however, that you already took the flag for another command and did not return it. E.g. if you wished to sequence sending of a series of commands.
It is possible to check if you have the rights by reading the active flag at register 7716. In this case, even if you read 0 at 7715 when you made the request, it is possible to send the commands.

b Step 2. **Fill in parameters**
Fill in the command parameters (P1 to P9) in registers 7721 to 7729.

b Step 3. **Write command**
 Write the command number to register 7720 to initiate execution.

b Step 4. **Wait for command being executed**
Wait until the command is **fully terminated**, by reading registers 7717 and 7718.
(recommanded time-out = 500 ms)

b Step 5. **Check Result code**
Check the result code for the command by reading register 7719.

b Step 6. **Send New command**
Send new commands in protected mode by starting with step 2 or go on to step 7.
(recommanded delay between command fully terminated and new command = 20 ms)

b Step 7. **Release the flag**
Return the flag to free the protected mode. See the command table for information on returning the flag.

Send commands in protected mode

Optimise sending of commands

It is possible to optimise data flow on the communication system by using function 16 in the Modbus protocol. In this case, the data may be written to registers 7720 to 7729 in a single step. The command interface will automatically put steps 2 and 3 in the correct order.

Caution. It is advised not to use function 23 to optimise steps 1, 2 and 3, because this function does not check access rights to protected mode before sending the command. This may cause problems for another supervisor who current has the access rights.

Most of the commands that may be used to remotely control the circuit breaker implement two steps, namely the request for the flag (step 1) and return of the flag (step 7).

This mechanism makes it possible for a number of supervisors to issue commands, on the condition that the two steps be implemented.

Using this procedure, you take and return the flag for each of the commands to be issued. In this case, the possible degree of parallelism between the various supervisors is increased, but at the cost of more traffic on the communication system.

If you have a number of commands to send, optimise the mechanism by sending all the commands between the two steps, i.e. request the flag, send all the commands in one shot and then return the flag. In this case, you occupy the command interface for a longer time, but traffic on the communication system is optimised.

Remote configuration

A number of simple concepts must be clear in order to remotely configure the circuit breaker successfully.

b Configuration is carried out via the configuration registers (R/W).
The configuration registers for all the managers (circuit breaker, chassis, metering and protection) may be read accessed in the table of registers.

The only way to remotely modify a configuration is to modify the contents of the configuration registers.

b The configuration registers (R/W) may be write accessed in configuration mode only.
To modify the configuration registers, it is necessary to remove the register write-protect function by running the command required to enter in configuration mode, via the command interface. Once in configuration mode, it is possible to write access the configuration registers and you may modify one or more configuration registers using the standard Modbus write functions.

Circuit-breaker manager   @ xx

Register range	Configuration registers
534-543	Identification of the Breaker Communication Module

Chassis manager   @ xx + 50

Register range	Configuration registers
534-543	Identification of the Chassis Communication Module

Metering manager   @ xx + 200

Register range	Configuration registers
3303-3355	Configuration of the metering manager
6000-6011	Configuration of Analog pre-defined Alarm 1
6012 to 6635	Configuration of Analog pre-defined Alarm 2 to 53

Protection manager   @ xx + 100

Register range	Configuration registers
8753-8803	Fine adjustments for the basic protection
9604-9618	Configuration of the protection manager
9629-9798	Settings for the advanced protections
9800-9846	Configuration of the output relays (M2C/M6C)

Specific conditions must be met to enter the configuration mode.

Remote access is not possible if local configuration is underway and vice-versa

When a local user is in the process of locally modifying the configuration of Micrologic or of its options, it is not possible to start a remote-configuration sequence.

Micrologic considers that a local user is in the process of modifying the configuration when a parameter field is displayed in reverse video or as soon as the Micrologic plastic cover is openend..

Access to configuration mode is subject to different restrictions depending on the manager

Access to configuration mode for the protection manager requires the remote-access code that was programmed on the front panel of the Micrologic control unit. This code (default value = 0000) may be obtained only via the setting screen on the Micrologic control unit itself. What is more, it is possible to access the configuration mode for the protection manager only if the Micrologic control unit has been set to authorise remote access. This setting must be made manually via the front panel of the Micrologic control unit. It is possible to consult the protection-manager register 9800 to check the status of this parameter. Then you can access to the the configuration mode for the protection manager by using the command In_pCfg.

Access to configuration mode for the circuit-breaker and metering managers requires a control word that must first be read in the table of registers.Register 553 is the control word for the circuit-breaker, register 3300 is the control word for the metering manager. Then you can access to the the configuration mode by using the command In_mCfg for the metering manager or by using the command In_CommCfg for the circuit-breaker manager.

This two-step operation is intended to avoid inadvertent access to the configuration mode.
The access commands for configuration mode implement the protected mode and systematically inform on the command result.

New configurations are always checked before being accepted

When writing in the configuration registers, the Modbus write functions are accepted, even if the written value exceeds the limits presented in the tables of registers that should be consulted first.

To assist in configuring the protection functions, Micrologic provides access to a set of registers that list the minimum and maximum permissible values for the various protection settings
All the configuration data entered are checked before they enter into effect. This check is run when you exit configuration mode, using the commands Out_pCfg for the protection manager, Out_mCfg for the metering manager or Out_CommCfg for the circuit-breaker manager.
If one of the configuration settings is incorrect, all the new configuration data are rejected. The system indicates why the data are rejected via the result returned for the command used to exit the configuration mode. The protection manager indicates the first ten faulty configuration registers. See the information on command Out_pCfg for further details.

The new configuration data take effect only on exiting configuration mode

The new configuration data take effect only on exiting configuration mode so that the data can be checked. I.e., it is when the Out_pCfg, Out_mCfg or Out_CommCfg command has been successfully run that the new configuration settings become active.

Example of a remote parameter-setting sequence
Below are the steps that must be followed to modify the long-time (LT) current setting.

b Step 1
Check that remote access is authorised by reading register 9800 at address @+100 [protection manager].

b Step 2
Make sure you have the remote-access code, noted on the "Local / Remote" screen in the "COM setup" menu of Micrologic.

b Step 3
Enter configuration mode for the protection manager, using the In_pCfg command. See the "Examples of commands" appendix.

b Step 4
Enter the new setting in registers 8753 to 8803, at the address @+100 [protection manager].
Make sure these new settings are below the value set by the rotary switch.

b Step 5
Exit configuration mode for the protection manager, using the Out_pCfg command, and check first for an error code returned by the command interface, then the parameters returned by Out_pCfg in registers 7730 to 7739 of the circuit-breaker command interface.

b Step 6
Read the contents of the registers 8756 and 8757. The settings should be those entered, if step 5 did not return an error.

Micrologic stores events anf wave form in diferent files. These files may be read with the command interface : ReadFileX_RecY. The requested recording may be read starting in registers 7730. See the section Appendix : Examples of commands.

A file is made up of records. All records in a file have the same structure and size. Each record, with a maximum of 100 is made up of a number of registers.
Each file is linked to a descriptor. The descriptor is made up of a read zone for file configuration (Header) and for file characteristics (Status). Descriptors are updated each time new data is added to the file.
The file configuration (Header) gives information about size of file and records.
The file characteristics (Status) gives information about record numbers. The file characteristics (Status) makes available to the supervisor two sequence registers that indicate the first and last events recorded in the file. They enable the supervisor to determine whether certain events were deleted before they could be read. The sequence number for the last event increments from 1 to 8000 each time a new event is recorded. When the file is full (maximum of 100), the new events overwrite the oldest events. The sequence number for the last event continues to increment normally. When the oldest event is overwritten, the sequence number for the first event also increments.
When the sequence number reachs 8000, the next sequence number will be one.

Event log
b The event log of the circuit-breaker manager   Micrologic A/E/P/H
The system stores the events that concern circuit-breaker control (e.g. opening or closing of the contacts) in the file N° **30**. This file is made up of 100 records, each record is made up of 5 registers. This file is reset in case of 24 VDC power loss on the Breaker Communication Module.
b The event log of the protection manager   Micrologic P/H
The system stores the events that concern the protection manager (trips, alarms) in the file N° **20**. .This file is made up of 100 records, each record is made up of 9 registers.
b The event log of the metering manager   Micrologic H
The system stores the events that concern the metering manager (Analog Pre-defined alarms 1 to 53) in the file N° **10**. .This file is made up of 100 records, each record is made up of 9 registers.
b The Maintenance event log of the protection manager Micrologic H
The system stores the events that concern the maintenance protection manager (power-up, M6C relays, Max peak fault current, …) in the file N° **21**. .This file is made up of 20 records, each record is made up of 6 registers.
This maintenance event log has been implemented as well on Micrologic P with firmware Plogic2002AA and above.
b The Maintenance event log of the metering manager   Micrologic H
The system stores the events that concern the maintenance metering manager (counter reset, …) in the file N° **12**. .This file is made up of 20 records, each record is made up of 6 registers.
b The min-MAX event log of the metering manager   Micrologic H
The system stores the events that concern the metering manager (minimum and Max values for the Real Time measurements 1000 to 1136) in the file N° **11**. .This file is made up of 136 records, each record is made up of 8 registers.

Wave Form Capture
b The WFC in the metering manager   Micrologic H
The system stores the variables Va, Vb, Vc, Ia, Ib, Ic, Ineutral during 4 cycles (64 points per cycles) in the file N° **5**.
The capture is triggererd :
- manually (user request) by using the command " Forcelog "
  (See the section Appendix : List of commands in the metering manager)
- automatically attached to Pre-defined analog alarms (1 to 53).by setting to 1 the log action.
  (See register 6010 for alarm N° 1, register 6634 for alarm N° 53)
b The Fault WFC in the protection manager   Micrologic H
The system stores the variables Va, Vb, Vc, Ia, Ib, Ic, Ineutral during 12 cycles (16 points per cycles) in the file N° **22**.
The capture is triggererd :
- automatically attached to alarms (1000 to 1030) .by setting to 1 the log action
  (See register 8762 for alarm N° 1000, register 9797 for alarm N° 1030)

Event log of
the circuit-breaker manager

Descriptor of the event log in the circuit-breaker manager
Event log configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
718	1	R	-	-	INT	0xFFFF	A/E	P/H	File status :0xFFFF= file enabled always equal to : 0xFFFF	nvCMFilHdrEvtLogCtrl Reg
719	1	R	-	-	INT	**30**	A/E	P/H	type of file: event log of the circuit-breaker manager always equal to : 30	nvCMFilHdrEvtLog FileType
720	1	R	-	-	INT	0xFFFF	A/E	P/H	File allocation : 0xFFFF= file allocated always equal to : 0xFFFF	nvCMFilHdrEvtLog Allocation
721	1	R	x1	regis- ter	INT	5	A/E	P/H	Size of records in register always equal to : 5	nvCMFilHdrEvtLog RecSize
722	1	R	-	-	INT	0	A/E	P/H	File filling mode : 0 = circular always equal to : 0	nvCMFilHdrEvtLog Mode

Event log characteristics **(status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
734	1	R	x1	rec.	INT	100	A/E	P/H	Size of file in records always equal to 100	nvCMFilStatusEvtLog_ AllocFileSize
735	1	R	x1	regis- ter	INT	5	A/E	P/H	size of a record in registers always equal to 5	nvCMFilStatusEvtLog_ AllocRecSize
737	1	R	x1	rec.	INT	0..100	A/E	P/H	number of records in the file 0 = no record in the file	nvCMFilStatusEvtLog_ NbOfRecords
738	1	R	x1	rec.	INT	0..8000	A/E	P/H	sequence number of first record in the file (the oldest) 0 = no record in the file	nvCMFilStatusEvtLog_ FirstRecNum
739	1	R	x1	rec.	INT	0..8000	A/E	P/H	sequence number of last record in the file (the most recent) 0: no record in the file	nvCMFilStatusEvtLog_ LastRecNum
740	3	R	-	-	DATE	-		P/H	date the last file was reset	nvCMFilStatusEvtLog_ LastResetTime

Event log of
the circuit-breaker manager

Format of records in the event log of the circuit-breaker manager

Registers	Description
1-4	Event date, in the XDATE format (see the section *appendix* : Formats)
5	Event number (See below)

Events in the event log of the circuit-breaker manager

Event number	Description
1	RESET or system energised
2	Configuration data stored in the chassis manager
3	Spring charged
4	Circuit breaker opened (O)
5	Circuit breaker closed (F)
6	Circuit breaker tripped (SD)
7	Circuit breaker fault tripped (SDE)
8	Reserved
9	Reserved
10	Closing command input remotely (AUTO) (XF)
11	Opening command input remotely (AUTO) (MX)
12	Modification of Modbus address
13	Event log reset
14	Clock update input locally accepted
15	Clock update input locally rejected (synchronisation by the supervisor)

Event log of
the protection manager

Descriptor of the event log in the protection manager

b Event log configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9900	1	R/W	-	-	INT	{0x0000, 0xFFFF}		P/H	file status **b** 0xFFFF: file enabled **b** 0: file disabled Default value: 0xFFFF	nvPMFilHdrEvtLogCtr lReg
9901	1	R	-	-	INT	**20**		P/H	type of file: protection-manager event log always equal to : 20	nvPMFilHdrEvtLog FileType
9902	1	R	x1	rec.	INT	100		P/H	size of file in records always equal to : 100	nvPMFilHdrEvtLog Allocation
9903	1	R	x1	regis- ter	INT	9		P/H	size of a record in registers always equal to : 9 registers per record	nvPMFilHdrEvtLog RecSize
9904	1	R	-	-	INT	0		P/H	file filling mode 0: circular always equal to 0	nvPMFilHdrEvtLog Mode

b event-log characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9916	1	R	x1	rec.	INT	100		P/H	size of file in records always equal to 100	nvPMFilStatusEvtLog_ AllocFileSize
9917	1	R	x1	regis- ter	INT	9		P/H	size of a record in registers: always equal to 9	nvPMFilStatusEvtLog_ AllocRecSize
9918	1	R	x1	-	INT	0,10,20,3 0,250,253 , 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		P/H	**b** 0: file OK **b** 10: record size smaller than expected **b** 20: record size larger than expected **b** 30: insufficient memory **b** 250: internal error **b** 253: corrupted allocation table **b** 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	nvPMFilStatusEvtLog_ FileStatus
9919	1	R	x1	rec.	INT	0..100		P/H	number of records in the file 0: no record in the file	nvPMFilStatusEvtLog_ NbOfRecords
9920	1	R	x1	rec.	INT	0..8000		P/H	sequence number of first record in the file (the oldest) 0: no record in the file	nvPMFilStatusEvtLog_ FirstRecNum
9921	1	R	x1	rec.	INT	0..8000		P/H	sequence number of last record in the file (the most recent). 0: no record in the file	nvPMFilStatusEvtLog_ LastRecNum
9922	3	R	-	-	DATE	cfformat		P/H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvPMFilStatusEvtLog_ LastResetTime

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Event log of
the protection manager

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Format of records in the event log of the protection manager

Registers	Description
1-4	Event date, in the XDATE format (see the section *appendix* : Formats)
5	Event number (see below)
6	Event characteristics [1]
7	Type of event [2]
8	Logging bitmap associated to the Alarm [3]
9	Action bitmap associated to the Alarm [3]

Note.
[1] *For alarms 1000 to 1004, the data is the value of the fault current interrupted by the circuit breaker. For all events, this value is forced to 32768.*

[2] *Bits 0 to 7*
The value 1 indicates an alarm of the "Over" type.
The value 2 indicates an alarm of the "Under" type.
The value 3 indicates an alarm of the "Minimum" type.
The value 4 indicates an alarm of the "Maximum" type.
The value 5 indicates an alarm of the "Assorted" type.
[2] *Bits 8 to 11*
The value 1 indicates the start of an alarm.
The value 2 indicates the end of an alarm
[2] *Bits 12 to 15*
Alarms 1100 to 1106 are priority 3. For the other alarms, the value contained in these four bits represents the priority linked to the event (if applicable and depending on the alarm configuration.

[3] *Registers 8 and 9 are a copy of the alarm-configuration registers at the moment the event occurred. They depend entirely on the user configurations. For the events 1100 to 1106, these registers are forced to 32768.*

Events in the event log of the protection manager

Event number	Description
1000 to 1015	Basic protection [1]
1016 to 1031	Advanced protection [1]
1100 to 1115	Digital alarms [1]

Note.

(1) See description of the "Alarm numbers" in the section Appendix: Trip/Alarm History

Descriptor of the event log in the metering manager

b Event log configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7164	1	R/W	-	-	INT	{0x0000, 0xFFFF}		H	log status **b** 0xFFFF: file enabled **b** 0: file disabled Default value: 0xFFFF	NvMMFilHdrEvtLogCt rlReg
7165	1	R	-	-	INT	**10**		H	type of file: metering-manager event log Default value: 10	NvMMFilHdrEvtLog FileType
7166	1	R	x1	rec.	INT	100		H	size of file in records Default value: 100 records per file	NvMMFilHdrEvtLog Allocation
7167	1	R	x1	regis- ter	INT	9		H	size of a record in registers Default value: 9 registers per record	NvMMFilHdrEvtLog RecSize
7168	1	R	-	-	INT	0		H	lFile filling mode : 0 = circular always equal to 0	nvMMFilHdrEvtLog Mode

b event-log characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7180	1	R	x1	rec.	INT	100		H	size of file in records :100 always equal to 100	NvMMFilStatusEvtLog_ AllocFileSize
7181	1	R	x1	regis- ter	INT	9		H	size of a record in registers: always equal to 9	NvMMFilStatusEvtLog_ AllocRecSize
7182	1	R	x1	-	INT	0,10,20,3 0,250,253 , 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		H	**b** 0: file OK **b** 10: record size smaller than expected **b** 20: record size larger than expected **b** 30: insufficient memory **b** 250: internal error **b** 253: corrupted allocation table **b** 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvMMFilStatusEvtLog_ FileStatus
7183	1	R	x1	rec.	INT	0..100		H	number of records in the file 0: no record in the file	NvMMFilStatusEvtLog_ NbOfRecords
7184	1	R	x1	rec.	INT	0..8000		H	sequence number of first record in the file (the oldest) 0: no record in the file	NvMMFilStatusEvtLog_ FirstRecNum
7185	1	R	x1	rec.	INT	0..8000		H	sequence number of last record in the file (the most recent) 0: no record in the file	NvMMFilStatusEvtLog_ LastRecNum
7186	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvMMFilStatusEvtLog_ LastResetTime

Event log of
the metering manager

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Format of records in the event log of the metering manager

Registers	Description
1-3	Event date, in the XDATE format (see the section *appendix* : Formats)
4	Reserved
5	Event number (see below)
6	Extreme value
7	Type of event [2]
8	Logging bitmap associated to the Alarm [3]
9	Action bitmap associated to the Alarm [3]

Note.
[2] Bits 0 to 7
The value 0 indicates an alarm of the "Over" type.
The value 1 indicates an alarm of the "Under" type.
The value 2 indicates an alarm of the "Equal to'type.
The value 3 indicates an alarm of the "Differrent from" type.
The value 5 is used for all other alarms
[2] Bits 8 to 11
The value 1 indicates the start of an alarm.
The value 2 indicates the end of an alarm.
[2] Bits 12 to 15
The value contained in these four bits represents the priority linked to the event (if applicable and depending on the alarm configuration.

[3] Registers 8 and 9 are a copy of the alarm-configuration registers at the moment the event occurred. They depend entirely on the user configurations.

Events in the event log of the metering manager

Event number	Description
1 to 53	Analog Pre-defined alarms

Note.
[1] See the "Analog pre-defined alarms"1 to 53 in the section : Appendix Table of registers 6000 to 6624

Maintenance event log of the protection manager

Descriptor of the Maintenance event log in the protection manager

b Event log configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9932	1	R/W	-	-	INT	0xFFFF		H	File status **b** 0xFFFF: file enabled always equal to: 0xFFFF	NvPMFilHdrMaintCtrl Reg
9933	1	R	-	-	INT	**21**		H	type of file: Maintenance protection-manager event log always equal to: 21	NvPMFilHdrMaint FileType
9934	1	R	x1	rec.	INT	20		H	size of file in records always equal to 20 records per file	NvPMFilHdrMaint Allocation
9935	1	R	x1	regis-ter	INT	6		H	size of a record in registers always equal to 6 registers per record	NvPMFilHdrMaint RecSize
9936	1	R	-	-	INT	1		H	log filling mode :1 = inhibition is full always equal to 1	nvPMFilHdrMaint Mode

b event-log characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9948	1	R	x1	rec.	INT	20		H	size of file in records : 20 size always equal to 20	NvPMFilStatusMaint_ AllocFileSize
9949	1	R	x1	regis-ter	INT	6		H	size of a record in registers: always equal to 6	NvPMFilStatusMaint_ AllocRecSize
9950	1	R	x1	-	INT	0,10,20,30,250,253, 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		H	**b** 0: file OK **b** 10: record size smaller than expected **b** 20: record size larger than expected **b** 30: insufficient memory **b** 250: internal error **b** 253: corrupted allocation table **b** 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvPMFilStatusMaint_ FileStatus
9951	1	R	x1	rec.	INT	20		H	number of records in the file Always Equal to 20	NvPMFilStatusMaint_ NbOfRecords
9952	1	R	x1	rec.	INT	1		H	sequence number of first record in the file Always Equal to 1	NvPMFilStatusMaint_ FirstRecNum
9953	1	R	x1	rec.	INT	20		H	sequence number of last record in the file Always Equal to 20	NvPMFilStatusMaint_ LastRecNum
9954	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvPMFilStatusMaint_ LastResetTime

Maintenance event log of the protection manager

Formats of records in the maintenance event log of the protection manager

This file consists of a fixed number of records (20). All records are of similar size, i.e 6 registers wide.

Record number	Registers	Description
1	1-3	Last Power Loss (XDATE Format)
	4-6	Reserved
2	1-3	Date/time of last counter reset (DATE Format)
	4	Number of output operations for relay 1
	5-6	Reserved
3 to 6	1-3	Date/time of last counter reset (DATE Format)
	4	Number of output operations for relay 3 to 6
	5-6	Reserved
7	1-3	Date/time of last counter reset (DATE Format)
	4	Number of output operations for relay 6
	5-6	Reserved
8	1-3	Date/time of last record updated (DATE Format)
	4	Worst contact wear
	5-6	Reserved
9	1-3	Date/time of last record updated (DATE Format)
	4	Max reverse power
	5-6	Reserved
10	1-3	Date/time of last record updated (DATE Format)
	4	Battery indicator (see register 8843)
	5-6	Reserved
11	1-3	Date/time of last record updated (DATE Format)
	1	Number of power losses
	5-6	Reserved
12	1-6	Reserved
13	1-6	Reserved
14	1-6	Reserved
15	1-6	Reserved
16	1-3	Date/time of last record updated (DATE Format)
	4	Number of Max resets
	5-6	Reserved
17	1-6	Reserved
18	1-3	Date/time of last record updated (DATE Format)
	4	Max peak fault current breaker ever opened
	5-6	Reserved
19	1-6	Reserved
20	1-6	Reserved

Maintenance event log of the metering manager

Descriptor of the Maintenance event log in the metering manager

b Event log configuration **(Header)**

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	label
7228	1	R/W	-	-	INT	0xFFFF		H	File status **b** 0xFFFF: file enabled always equal to 0xFFFF	NvMMFilHdrMaintCtrl Reg
7229	1	R	-	-	INT	**12**		H	type of file: Maintenance metering-manager event log always equal to: 12	NvMMFilHdrMaint FileType
7230	1	R	x1	rec.	INT	20		H	size of file in number of records always equal to 20 records per file	NvMMFilHdrMaint Allocation
7231	1	R	x1	register	INT	6		H	size of a record in number of registers always equal to 6 registers per record	NvMMFilHdrMaint RecSize
7232	1	R	-	-	INT	1		H	log filling mode :1= disabled if log is full always equal to 1	nvMMFilHdrMaint Mode

b event-log characteristics **(Status)**

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	label
7244	1	R	x1	rec.	INT	20		H	size of file in records:20 always equal to 20	NvMMFilStatusMaint_ AllocFileSize
7245	1	R	x1	register	INT	6		H	size of a record in registers: always equal to 6	NvMMFilStatusMaint_ AllocRecSize
7246	1	R	x1	-	INT	0,10,20,30,250,253, 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		H	**b** 0: file OK **b** 10: record size smaller than expected **b** 20: record size larger than expected **b** 30: insufficient memory **b** 250: internal error **b** 253: corrupted allocation table **b** 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvMMFilStatusMaint_ FileStatus
7247	1	R	x1	rec.	INT	20		H	number of records in the file Always Equal to 20	NvMMFilStatusMaint_ NbOfRecords
7248	1	R	x1	rec.	INT	1		H	sequence number of first record in the file Always Equal to 1	NvMMFilStatusMaint_ FirstRecNum
7249	1	R	x1	rec.	INT	20		H	sequence number of last record in the file Always Equal to 20	NvMMFilStatusMaint_ LastRecNum
7250	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvMMFilStatusMaint_ LastResetTime

Maintenance event log of the metering manager

Formats of records in the maintenance event log of the metering manager

This file consists of a fixed number of records (20). All records are of similar size, i.e 6 registers wide.

Record number	Registers	Description
1	1-3	Date/time of last counter reset (DATE Format)
	4	Number of min resets
	5-6	Reserved
2	1-3	Date/time of last counter reset (DATE Format)
	4	Number of Max resets
	5-6	Reserved
3	1-3	Date/time of last counter reset (DATE Format)
	4	Number of Peak current Demand resets
	5-6	Reserved
4	1-3	Date/time of last counter reset (DATE Format)
	4	Number of Peak power demand resets
	5-6	Reserved
5	1-3	Date/time of last counter reset (DATE Format)
	4	Number of Energy resets
	5-6	Reserved
6 to 20	1-6	Reserved

Min-Max event log of the metering manager

Descriptor of the min-Max event log in the metering manager

b Event log configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7196	1	R/W	-	-	INT	0xFFFF		H	File status **b** 0xFFFF: file enabled always equal to 0xFFFF	NvMMFilHdrMinMax CtrlReg
7197	1	R	-	-	INT	**11**		H	type of file: Min/Max event log = 11 always equal to: 11	NvMMFilHdrMinMax FileType
7198	1	R	x1	rec.	INT	Real Time zone size		H	size of file in number of records. identical to the size of the MM Real Time zone. always equal to 136	NvMMFilHdrMinMax Allocation
7199	1	R	x1	regis- ter	INT	8		H	size of records in number of registers always equal to 8 registers per record	NvMMFilHdrMinMax RecSize
7200	1	R	-	-	INT	1		H	log filling mode 1: disabled if log is full always equal to 1	nvMMFilHdrMinMax Mode

b event-log characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7212	1	R	x1	rec.	INT	Real Time zone size		H	size of file in records: size always equal to Real Time zone size Value equal to 136	NvMMFilStatusMinMax_ AllocFileSize
7213	1	R	x1	regis- ter	INT	8		H	size of a record in registers: always equal to 8	NvMMFilStatusMinMax_ AllocRecSize
7214	1	R	x1	-	INT	0,10,20,30,250,253, 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		H	**b** 0: file OK **b** 10: record size smaller than expected **b** 20: record size larger than expected **b** 30: insufficient memory **b** 250: internal error **b** 253: corrupted allocation table **b** 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvMMFilStatusMinMax_ FileStatus
7215	1	R	x1	rec.	INT	Real Time zone size		H	Actual numberr of records in the file.Always Equal to Real Time zone size. Value equal to 136	NvMMFilStatusMinMax_ NbOfRecords
7216	1	R	x1	rec.	INT	1		H	number of first record present Always Equal to 1	NvMMFilStatusMinMax_ FirstRecNum
7217	1	R	x1	rec.	INT	Real Time zone size		H	number of last record present Always Equal to 20	NvMMFilStatusMinMax_ LastRecNum
7218	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvMMFilStatusMinMax_ LastResetTime

Min-Max event log of the metering manager

Format of Records in the min-Max event log of the metering manager

This file contains the minimum and Maximum values reached by the Real Time measurements.

Real Time value :   See registers 1000 to 1135
Min of Real Time value :   See registers 1300 to 1435
Max of Real Time value :   See registers 1600 to 1735

All records are of similar size, i.e 8 registers wide.

Record number	Registers	Description
1	1	Last Min Value (register 1300)
	2-4	Date/time of last Min Value (DATE Format)
	5	Last Max Value (register 1600)
	6-8	Date/time of last Max Value (DATE Format)
2	1	Last Min Value (register 1301)
	2-4	Date/time of last Min Value (DATE Format)
	5	Last Max Value (register 1601)
	6-8	Date/time of last Max Value (DATE Format)
X (3 to 135)	1	Last Min Value (register 130**x**)
	2-4	Date/time of last Min Value (DATE Format)
	5	Last Max Value (register 160**x**)
	6-8	Date/time of last Max Value (DATE Format)
136	1	Last Min Value (register 1435)
	2-4	Date/time of last Min Value (DATE Format)
	5	Last Max Value (register 1735)
	6-8	Date/time of last Max Value (DATE Format)

Wave Form Capture

Descriptor of the Wave Form Capture in the metering manager

b Wave Form Capture configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7132	1	R/W	-	-	INT	{0x0000, 0xFFFF}		H	File status :0xFFFF = file enabled **b** 0x0000 = file disabled Default value: 0xFFFF	NvMMFilHdrWFC.Ctrl Reg
7133	1	R	-	-	INT	**5**		H	type of file: Wave Form Capture always equal to: 5 (WFC)	NvMMFilHdrWFC FileType
7134	1	R	x1	rec.	INT	29		H	size of file in number records = 29 always equal to 29 records/file	NvMMFilHdrWFC Allocation
7135	1	R	x1	regis- ter	INT	64		H	size of records in number of registers always equal to: 64 registers per record	NvMMFilHdrWFC RecSize
7136	1	R	-	-	INT	{0,1}		H	File filling mode : 1: disabled if log is full. 0: circular. Default value: 0	nvMMFilHdrWFC Mode
7137		R	1	Seg ment	INT	1		H	Number of 4 cycle segments Always equal to 1	nvMMFilHdrWFC MaxNumOfSegments
7138		R	1	Cycle	INT	2		H	Number of cycle before capture always equal to 2	nvMMFilHdrWFC PreAlarmCycles
7139		R	1	point s	INT	64		H	Number of points per cycle always equal to 64	nvMMFilHdrWFC PointsPerCycle

b Wave Form Capture characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
7148	1	R	x1	rec.	INT	{0,29}		H	size of file in records either equal to 0 or 29	NvMMFilStatusWFC_ AllocFileSize
7149	1	R	x1	regis- ter	INT	64		H	size of a record in registers: always equal to 64	NvMMFilStatusWFC_ AllocRecSize
7150	1	R	x1	-	INT	0,10,20,3 0,250,253 , 254,255, 0xFF00, 0xFE00, OxFD00, OxFC00		H	**b** 0: file OK. 10: record size smaller than expected. 20: record size larger than expected. 30: insufficient memory. 250: internal error. 253: corrupted allocation table. 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvMMFilStatusWFC_ FileStatus
7151	1	R	x1	rec.	INT	{0,29}		H	Actual number of records in the file. either equal to 0 or 29	NvMMFilStatusWFC_ NbOfRecords
7152	1	R	x1	rec.	INT	{0,1}		H	number of first record present either equal to 0 or 1	NvMMFilStatusWFC_ FirstRecNum
7153	1	R	x1	rec.	INT	{0,29}		H	number of last record present either equal to 0 or 29	NvMMFilStatusWFC_ LastRecNum
7154	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	nvMMFilStatusWFC_ LastResetTime

Wave Form Capture

Format of records in the Wave Form Capture of the metering manager

This file consists of a fixed number of records (29). All records are of similar size, i.e 64 registers wide.

Record number	Registers	Description
1	1-4	Extended Date/time
	5-11	Reserved
	12	Id of WFC trigger (analog pre-defined alarm 1 to 53)
		Available with firmware HLogic2005AF
	13	System type :31, 40 or 41 (See register 3314)
	14	Breaker nominal current in Amps
	15	Voltage multiplier for phase A (format is SFIXPT)
	16	Voltage Offset for phase A (format is INT)
	17	Same as 15, for phase B
	18	Same as 16, for phase B
	19	Same as 15, for phase C
	20	Same as 16, for phase C
	21	Current multiplier for phase A (format is SFIXPT)
	22	Current Offset for phase A (format is INT)
	23	Same as 21, for phase B
	24	Same as 22, for phase B
	25	Same as 21, for phase C
	26	Same as 22, for phase C
	27	Current multiplier for Neutral (format is SFIXPT)
	28	Same as 22, for Neutral
	29	Scaling factor used for SFIXPT math on voltage samples
	30	Scaling factor used for SFIXPT math on phase current samples
	31	Scaling factor used for SFIXPT math on neutral current samples
	32 to 64	Not used
2 to 5	1-64	Voltage A Sample points (64 points – 4 cycles)
6 to 9	1-64	Voltage B Sample points (64 points – 4 cycles)
10 to 13	1-64	Voltage C Sample points (64 points – 4 cycles)
14 to 17	1-64	Current A Sample points (64 points – 4 cycles)
18 to 21	1-64	Current B Sample points (64 points – 4 cycles)
22 to 25	1-64	Current C Sample points (64 points – 4 cycles)
26 to 29	1-64	Current N Sample points (64 points – 4 cycles) Only valid in 41 system

In order to derive phase A Voltage, apply this rule :

Sample (Volt) = [(sample – reg.16 of 1st rec.) x reg 15 of 1st rec.] / reg.29 of 1st rec.

Register 18,17 for phase B voltage ; Register 20, 19 for phase C Voltage

In order to derive phase A Current , apply this rule :

Sample (Amp) = [(sample – reg.22 of 1st rec.) x reg 21 of 1st rec.] / reg.30 of 1st rec.

Register 24,23 for phase B Amp ; Register 26, 25 for phase C Amp

In order to derive Neutral Amp Current , apply this rule :

Sample (Amp) = [(sample – reg.28 of 1st rec.) x reg 27 of 1st rec.] / reg.31 of 1st rec.

Fault Wave Form Capture

Descriptor of the Fault Wave Form Capture in the protection manager

b Fault Wave Form capture configuration **(Header)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9964	1	R/W	-	-	INT	{0x0000, 0xFFFF}		H	File status :0xFFFF: file enabled **b** 0: file disabled Default value: 0xFFFF	NvPMFilHdrFWFC.CtrlReg
9965	1	R	-	-	INT	**22**		H	type of file:Fault Wave Form Capture Default value: 22 (FWFC)	NvPMFilHdrFWFC FileType
9966	1	R	x1	rec.	INT	22		H	size of file in number records always equal to 22 records/file	NvPMFilHdrFWFC Allocation
9967	1	R	x1	regis-ter	INT	64		H	size of records in number of registers always equal to: 64 registers per record	NvPMFilHdrFWFC RecSize
9968	1	R	-	-	INT	0		H	file filling mode : 1: disabled if log is full. 0: circular. Default value: 0	NvPMFilHdrFWFC Mode
9969		R	1	Segment	INT	1		H	Number of 12 cycle segments Always equal to 1	NvPMFilHdrFWFC MaxNumOfSegments
9970		R	1	Cycle	INT	2		H	Number of cycle before capture always equal to 2	NvPMFilHdrFWFC PreAlarmCycles
9971		R	1	points	INT	16		H	Number of points per cycle always equal to 16	NvPMFilHdrFWFC PointsPerCycle

b Fault Wave Form capture characteristics **(Status)**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9980	1	R	x1	rec.	INT	{0,22}		H	size of file in records either equal to 0 or 22	NvPMFilStatusFWFC_ AllocFileSize
9981	1	R	x1	regis-ter	INT	64		H	size of a record in registers always equal to 64	NvPMFilStatusFWFC_ AllocRecSize
9982	1	R	x1	-	INT	0,10,20,30,250,253,254,255,0Xff00,0xFE00,OxFD00,OxFC00		H	**b** 0: file OK. 10: record size smaller than expected. 20: record size larger than expected. 30: insufficient memory. 250: internal error. 253: corrupted allocation table. 254: configuration zero **b** 255: invalid configuration **b** 0xFF00: cannot allocate file **b** 0xFE00: file not supported **b** 0xFD00: invalid record number **b** 0xFC00: invalid file number	NvPMFilStatusFWFC_ FileStatus
9983	1	R	x1	rec.	INT	{0,22}		H	Actual number of records in the file. Either equal to 0 or 22	NvPMFilStatusFWFC_ NbOfRecords
9984	1	R	x1	rec.	INT	{0,1}		H	number of first record present either equal to 0 or 1	NvPMFilStatusFWFC_ FirstRecNum
9985	1	R	x1	rec.	INT	{0,22}		H	number of last record present either equal to 0 or 22	NvPMFilStatusFWFC_ LastRecNum
9986	3	R	-	-	DATE	cfformat		H	date the last file was reset Default value: 0x8000 0x8000 0x8000	NvPMFilStatusFWFC_ LastResetTime

Format of records in the Fault Wave Form Capture of the protection manager

This file consists of a fixed number of records (22). All records are of similar size, i.e 64 registers wide.

Record number	Registers	Description
1	1-4	Extended Date/time
	5-11	Reserved
	12	Id of fault WFC Trigger : Alarm number : 1000 to 1031
		(See the section appendix : Trip/Alarm history)
	13	System type :31, 40 or 41 (See register 3314)
	14	Breaker nominal current in Amps
	15	Voltage multiplier for phase A (format is SFIXPT)
	16	Voltage Offset for phase A (format is INT)
	17	Same as 15, for phase B
	18	Same as 16, for phase B
	19	Same as 15, for phase C
	20	Same as 16, for phase C
	21	Current multiplier for phase A (format is SFIXPT)
	22	Current Offset for phase A (format is INT)
	23	Same as 21, for phase B
	24	Same as 22, for phase B
	25	Same as 21, for phase C
	26	Same as 22, for phase C
	27	Current multiplier for Neutral (format is SFIXPT)
	28	Same as 22, for Neutral
	29	Scaling factor used for SFIXPT math on voltage samples
	30	Scaling factor used for SFIXPT math on phase current samples
	31	Scaling factor used for SFIXPT math on neutral current samples
	32 to 64	Not used
2 to 4	1-64	Voltage A Sample points (16 points – 12 cycles)
5 to 7	1-64	Voltage B Sample points (16 points – 12 cycles)
8 to 10	1-64	Voltage C Sample points (16 points – 12 cycles)
11 to 13	1-64	Current A Sample points (16 points – 12 cycles)
14 to 16	1-64	Current B Sample points (16 points – 12 cycles)
17 to 19	1-64	Current C Sample points (16 points – 12 cycles)
20 to 22	1-64	Current N Sample points (16 points – 12 cycles) Only valid in 41 system

In order to derive phase A Voltage, apply this rule :

Sample (Volt) = [(sample – reg.16 of 1st rec.) x reg 15 of 1st rec.] / reg.29 of 1st rec.

Register 18,17 for phase B voltage ; Register 20, 19 for phas e C Voltage

In order to derive phase A Current , apply this rule :

Sample (Amp) = [(sample – reg.22 of 1st rec.) x reg 21 of 1st rec.] / reg.30 of 1st rec.

Register 24,23 for phase B Amp ; Register 26, 25 for phase C Amp

In order to derive Neutral Amp Current , apply this rule :

Sample (Amp) = [(sample – reg.28 of 1st rec.) x reg 27 of 1st rec.] / reg.31 of 1st rec.

Introduction
Modbus is an application layer messaging protocol, positioned at level 7 of the OSI mode, that provides client/server communication between devices connected on different types of buses or networks.
The Internet community can access Modbus at a reserved system port 502 on the TCP/IP stack.
Modbus is a request/reply protocol and offers services specified by function codes.

Modbus / Jbus protocol
In the Modbus protocol, register numbering begins with 1, whereas in the JBus protocol, numbering of the equivalent registers begins with 0. However, a JBus master can dialogue with a Modbus slave by addressing a **register number - 1** to access the correct register on the Modbus slave.

Example of a request to read a register
In order to read the rms current on phase 1 (register 1016), you will have to address the register number 1016 – 1 = 1015
1015 = 0x03F7 (hexa)

Request			**Response**		
Function		03	Function		03
Starting Address	Hi	03	Byte count		02
Starting Address	Lo	F7	Register value	Hi	02
N° of registers	Hi	00	Register value	Lo	2B
N° of registers	Lo	01			

The contents of register 1016 (rms current on phase 1) are shown as the two byte values of 02 2B (hexa), or 555 decimal.
Therefore, rms current on phase 1 is 555 Amps.

Modbus exeption responses
When a client device (master) sends a request to a server device (slave) it expects a normal response. One of four possible events can occur from the master's query :
- If the server device receives the request without a communication error, and can handle the query normally, it returns a normal response.
- If the server device does not receive the request due to a communication error, no response is returned. The client program will eventually process a timeout condition for the request.
- If the server device receives the request, but detects a communication error (parity, LRC, CRC,…), no response is returned. The client program will eventually process a timeout condition for the request.
- If the server device receives the request without a communication error, but cannot handle it (for example, if the request is to read a non existing register), the server will return an exeption response informing the client of the nature of the error.

The exeption response message has two fiels that differentiate it from a normal response:
Function code: Function code of the original request + 0x80 (hexa)
Exeption code: See list below

01	ILLEGAL FUNCTION
02	ILLEGAL DATA ADDRESS
03	ILLEGAL DATA VALUE
04	SLAVE DEVICE FAILURE
05	ACKNOWLEDGE (in conjunction with programming commands)
06	SLAVE DEVICE BUSY(in conjunction with programming commands)
08	MEMORY PARITY ERROR (with function code 0x14)

Modbus functions

Read functions

Function code	Sub-function	Description
3		Read n output or internal registers (1) (2)
4		Read n input registers (1) (2)
23		Simultaneously read/write n and p registers (1) (2)
43		Read Device Identification (3)

Write functions

Function code	Sub-function	Description
6		Write one register
16		Write n registers (1) (2)
22		Write one register with mask
23		Simultaneously read/write n and p registers (1) (2)

(1) Registers 4XXXX and 3XXXX are linked to the same data in registers XXXX in the data tables.
(2) The n (or p) words constitute a block specified by the basic block address and the size of the block.
(3) Read Device Identification is available only with a Breaker Communication Module firmware version gr
equal to V2.0 (register 577 must be greater or equal to 02000).

Diagnosis functions

These functions act exclusively on the circuit-breaker manager (@ xx) and the chassis man
(@ xx +50).

Function code	Sub-function	Description
8		Management of the diagnostics counters
8	10	Clear the diagnostics counters
8	11	Read the bus-messages counter managed by the slave
8	12	Read the bus-errors counter managed by the slave
8	13	Read the bus exception answer counter managed by the slave
8	14	Read the counter for messages sent to the slave
8	15	Read the counter for messages sent to the slave and to which the slave did not answer
8	16	Read the counter for messages sent to the slave and to which the slave replied with an exception code 07 "Negative Acknowledge"
8	17	Read the counter for messages sent to the slave and to which the slave replied with an exception code 06 "Slave Device Busy"
8	18	Read the counter for messages sent to the slave that it could not process due to a transmission error
11		Read the Modbus event counter
17		Read the identifier of the Modbus slave

Read File Record : function 20 (0x14)

This function acts exclusively on the protection manager (@ xx +100) and the metering
manager (@ xx +200).
This function code is used to perform a file record read. All Request Data Lengths are provi
in terms of number of bytes and all Record Lengths are provided in terms of registers.
The quantity of registers to be read, combined with all other fields in the expected response
must not exceed the allowable length of Modbus messages : 256 bytes.

Request			Response		
Function code	1 Byte	**0x14**	Function	1 Byte	**0x14**
Byte count	1 Byte	0x07	Data Length	1 Byte	2 + **N**x2
Reference Type	1 Byte	0x06	File Resp.Length	1 Byte	1 + **N**x2
File number	2 Bytes	0x0000 to 0xFFFF	Reference type	1 Byte	0x06
Record number	2 Bytes	0x0000 to 0x270F	Record Data	**N**x2 Bytes	Data
Record length	2 Bytes	**N**			

Example of a request to read the most recent record in the event log of the protection manager

The event log of the protection manager is the file N° 20 (0x0014). This file is made up of 1(
records, each record is made up of 9 registers. So, the record length is 9 (0x0009). The
sequence number of last record in the file (the most recent) is the content of register 9921.
Let's take 0x1234 for the content of register 9921.

Request			**Response**		
Function code	1 Byte	0x14	Function	1 Byte	0x14
Byte count	1 Byte	0x07	Data Length	1 Byte	0x14
Reference Type	1 Byte	0x06	File Resp.Length	1 Byte	0x13
File number	2 Bytes	0x0014	Reference type	1 Byte	0x06
Record number	2 Bytes	0x1234	Record Data	**9**x2 Bytes	Data
Record length	2 Bytes	**0x0009**			

Read n non-contiguous words (function 100, sub-function 4)

The n non-contiguous registers must be specified one after the other by their register in the
table. The Maximum for n is 100.

To optimise access to Micrologic and its COM options, it may be very useful to read n non-
contiguous registers in a data table.

Use of function 100, sub-function 4 avoids:
b reading a large block of contiguous data when only a few elements of data are required
b multiplying read functions for n registers (functions 3 and 4) or for one register (function 1
simply to read a few elements of non-contiguous data.

The table below provides an example of reading the data in registers 101 and 103 of the sla
with the Modbus address 47.

Request		**Answer**	
Name of field	**Example**	**Name of field**	**Example**
Slave address	47	Slave address (identical)	47
Function [(1)]	100	Function [(1)]	100
Number of registers read +2	6	Number of bytes requested and returned + 2	6
Sub-function code [(1)]	4	Sub-function code [(1)]	4
Transmission number [(2)]	0xXX	Transmission number [(2)]	0xXX
Address of first register to read (most significant byte)	0	First register read (most significant byte)	0x12
Address of first register to read (least significant byte)	101	First word register (least significant byte)	0x0A
Address of second register to read (most significant byte)	0	Second register read (most significant byte)	0xFA
Address of second register to read (least significant byte)	103	Second register read (least significant byte)	0x0C
CRC high	XX	CRC high	XX
CRC low	XX	CRC low	XX

Note.
[(1)] *These values are constant.*

[(2)] *The transmission number is provided by the master prior to each request for a non-contiguous read. T
slave device must return the same number.*

Format

Formats

UINT

UINT corresponds to a 16-bit unsigned integer with an interval of values from 0x0000…0xFF
(0…65535).

INT

INT corresponds to a 16-bit signed integer with an interval of values from 0x8000…0x7FFF
32768…+32767).

Mod10000

Mod10000 corresponds to n registers in the INT format.
Each register contains an integer from 0 to 9999. A value V representing n registers is
calculated as indicated below.
$V = sum(R[n] + R[n+1] \times 10000 + .. + R[n+m] \times 10000^{(m-1)})$,
where Rn is the number of register n.
Example : Register 2000 = 123 ; Register 2001 = 4567; Register 2002 = 89 ; Register 2003
Energy = 123 + 4567x10 000 + 89x(10 000)² + 0 = 89 4567 0123 kWh

SFIXPT

SFIXPT corresponds to a signed INT integer with a fixed point. The position of the point is
indicated by the scale factor. The interval of values is:
-32767…+32767 with a scale factor "x1".
Other example:
-32.767…+32.767 with a scale factor "x1000".

DATE

Date corresponds to a normal date made up of three UINT, as follows:
b first UINT:
month expressed using the eight most-significant bits
day expressed using the eight least-significant bits [1]
b second UINT:
year expressed using the eight most-significant bits (modulo 100)
(00 to 49 → years 2000 to 2049, from 50 to 99 → years 1950 to 1999)
hours expressed using the eight least-significant bits
b third UINT:
minutes expressed using the eight most-significant bits
seconds expressed using the eight least-significant bits.

XDATE

XDATE corresponds to an extended date made up of four UINT, as follows:
b first UINT:
month expressed using the eight most-significant bits [1]
day expressed using the eight least-significant bits
b second UINT:
year expressed using the eight most-significant bits (modulo 100)
(00 to 49 → years 2000 to 2049, from 50 to 99 → years 1950 to 1999)
hours expressed using the eight least-significant bits
b third UINT:
minutes expressed using the eight most-significant bits
seconds expressed using the eight least-significant bits.
b fourth UINT: milliseconds.

ASCII

ASCII corresponds to a series of n UINT registers forming a sting of ASCII characters. The
character is contained in the eight most-significant bits of the register. The start of the string
the first register.

Note.
[1] *If the most-significant bit is set, the date and time may be incorrect. There are two possibilities:*
- no synchronisation with the supervisor
- loss of power.
If power has been lost, the self-test bitmap "D/T loss" is enabled until the date and time are enabled (via
control unit or the communication manager).

Trip/Alarm history

TRIP RECORD

TRIP RECORD format matches the trip history displayed on the graphic screen of the Micrologic (P/H only).
TRIP RECORD format presents the characteristics of a fault trip. It corresponds to a series of ten fields (9100, 9120, 9140,…,9280) with a total of 20 registers.
Register 9099 return the value of the pointer for the last fault recorded in the trip history.
Each field (containing 20 registers) is presented below:

Field	Nbr of registers	Format	Interval	N/A	Description
___.XtedDT	4	XDATE	Cfformat	0x8000	Trip date
___.ActCause AlarmNum	1	INT	0..1031	0x8000	Number of alarm causing activation
___.PuValue	2	MOD 10000	See text	0x8000	Value of protection setting that caused trip
___.PuDelay	1	INT	See text	0x8000	Value of time delay that caused trip
___.FaultI[0]	1	INT	0..16000	0x8000	Trip current phase 1, expressed with respect to the rated current [1]
___.FaultI[1]	1	INT	0..16000	0x8000	Trip current phase 2, expressed with respect to the rated current [1]
___.FaultI[2]	1	INT	0..16000	0x8000	Trip current phase 3, expressed with respect to the rated current [1]
___.FaultI[3]	1	INT	0..16000	0x8000	Trip current on neutral, expressed with respect to the rated current [1]
___.WorstContact Wear	1	INT	0..32767	0x8000	New value of contact-wear indicator following a trip.The control unit records one indicator per contact. Here, only the value for the most worn contact is given. (See registers 9094 to 9097)
___.AddInfo	2	See text	See text	0x8000	Reserved
___.Reserved	5	-	-	0x8000	Reserved

[1] *Expressed as x 0.1 of In (rated current)*

ALARM RECORD

ALARM RECORD format matches the alarm history displayed on the graphic screen of the Micrologic (P/H only).
ALARM RECORD format presents the characteristics of a fault alarm. It corresponds to a series of ten fields (9302, 9317, 9332, …, 9437) with a total of 15 registers.
Register 9301 return the value of the pointer for the last alarm recorded in the alarm history.

Each field (containing 15 registers) is presented below:

Field	Nbr of registers	Format	Interval	N/A	Description
___.XtedDT	4	XDATE	cfformat	0x8000	Alarm date
___.ActCause AlarmNum	1	INT	0..1031	0x8000	Number of alarm causing activation
___.PuValue	2	MOD 10000	See text	0x8000	Value of protection setting that caused alarm activation
___.PuDelay	1	INT	See text	0x8000	Value of time delay that caused alarm activation
___.FaultI[0]	1	INT	0..16000	0x8000	Alarm current phase 1, expressed with respect to the rated current [1]
___.FaultI[1]	1	INT	0..16000	0x8000	Alarm current phase 2, expressed with respect to the rated current [1]
___.FaultI[2]	1	INT	0..16000	0x8000	Alarm current phase 3, expressed with respect to the rated current [1]
___.FaultI[3]	1	INT	0..16000	0x8000	Alarm current on neutral, expressed with respect to the rated current [1]
___.AddInfo	2	See text	See text	0x8000	Additional information, depending on type of alarm
___.Reserved	1	-	-	0x8000	Reserved

[1] *Expressed as x 0.1 of In (rated current)*

Alarm numbers:

b Basic protections

Description		Number
Long-time protection	Ir	1000
Short-time protection	Isd	1001
Instantaneous protection	Ii	1002
Ground-fault protection	Ig	1003
Earth-leakage protection	IDelta n	1004
Auto Protection (DIN)		1005
Reserved		1006 to 1007
Trip due to advanced protection		1008
Trip due to extended advanced protection		1009
Reserved		1010
Reserved		1011 to 1013
Ground-fault protection alarm		1014
Earth-leakage protection alarm		1015

b Advanced protections

Description	Number
Current unbalance	1016
Over current phase A	1017
Over current phase B	1018
Over current phase C	1019
Over current on the Neutral	1020
Under voltage	1021
Over voltage	1022
Voltage unbalance	1023
Over power	1024
Reverse power	1025
Under frequency	1026
Over frequency	1027
Phase rotation	1028
Current load shedding	1029
Power load shedding	1030
Reserved	1031

Digital alarms

Description	Number
System energised / reset	1100
Reserved	1101 to 1105
Loss of date and time	1106
Reserved	1107 to 1114
Battery low	1115

Table of registers
Structure of the table

Each Modbus logical table is made up of the fields listed below.

b register: number of the Modbus register.

b nbr of registers: number of registers that must be read or written for a given complete piece of information. This datum indicates the type of register (8-bit, 16-bit or 32-bit word).

b read/write:
"R": register that may be accessed by the Modbus read functions 3, 4, 23, 20, 100 (see page 41). Modbus function 20 is supported by the Metering and Protection managers only.
"W": register that may be accessed by the Modbus write functions 6, 16, 22, 23 (see page 40)
"R/W": register that may be read and write accessed.

b scale (x n): value contained in the register multiplied by n. The requested information is obtained by dividing the register contents by n. The result in expressed in the indicated unit.

b unit: unit of measurement for the value contained in the register.

b format: format in which the information is coded.

b interval: interval of the possible values that each register in the group {Register, Register +1,..., Register + Nb} can have.

b A, E, P, H: type of control unit using the register:
"A": Micrologic A control unit
"E": Micrologic E control unit
"P": Micrologic P control unit
"H": Micrologic H control unit

b description: additional information describing the register, providing coding data and any necessary information on how to modify the register, particularly when the command interface is required to carry out the modification.

b label: name given to all the concerned registers.

Configuration of the circuit-breaker manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
515	1	R	-	-	INT	15139	A/E	P/H	Square D Product Identification 15139 = Breaker Communication Module	EeSQD_Prod_ID
531	1	R/W	-	-	INT	1..47	A/E	P/H	MODBUS address of the COM option (@XX) Default value: 47	eeAdrBus
532	1	R/W	-	-	INT	0..1	A/E	P/H	Parity: **b** 0: no parity **b** 1: even parity Default value: 1	eeParityBus
533	1	R/W	-	-	INT	1200.. 38400	A/E	P/H	Baud rate: **b** 1200: 1200 baud **b** 2400: 2400 baud **b** 4800: 4800 baud **b** 9600: 9600 baud **b** 19200: 19200 baud **b** 38400: 38400 baud Default value: 19200	eeBaudRate

Identification of the circuit-breaker manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
534	2	R/W	-	-	ASCII	0x00.. 0x7F	A/E	P/H	short identifier of circuit-breaker COM option, coded over 4 ASCII characters Default value: 0x00	eeBCM_Loc
536	8	R/W	-	-	ASCII	0x00.. 0x7F	A/E	P/H	long identifier of circuit-breaker COM option, coded over 16 ASCII characters Default value: 0x00	eeBCM_NamePlate

Table of registers
Circuit-breaker manager @ xx

Diagnostics counters and Control word

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
544	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to the slave (identical to function 8-14) [2]	CtrMsgSentThisUnit
545	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to other slaves [2]	CtrMsgSentOtherUnit
546	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – bus messages managed by the slave (identical to function 8-11) [2]	CtrMsgRX_ValidCRC
547	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter –bus errors managed by the slave (identical to function 8-12) [2]	CtrMsgRX_InvalidCRC
548	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to the slave comprising a non-supported Modbus function [2]	CtrMsgRX_InvalidFC
549	1	R	-	-	INT	0..32767	A/E	P/H	Modbus event counter (identical to function 11) [2]	CtrModbusEvtCtr
550	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter –bus exception replies managed by the slave (identical to function 8-13) [2]	CtrExceptionReplies
551	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – broadcast messages received by the slave (identical to function 8-17) [2]	CtrMsgRX_Broadcast
553	1	R	-	-	INT	0..65535	A/E	P/H	Control word of the circuit-breaker COM option. This Control word cannot be set by the user. It is randomly changed each time the system is energised. It is necessary to read the Control word before sending certain commands to the circuit-breaker COM option.	Control word
554	1	R	-	-	INT	0..65535	A/E	P/H	Counter for number of times the circuit-breaker COM option is energised [1]	eeCtrPowerUp
555	1	R	-	-	INT	0..65535	A/E	P/H	Counter for the number of circuit-breaker COM option resets, whether following power loss or not. [1]	eeCtrReset
577	1	R	1	-	INT	-	A/E	P/H	Breaker Communication Module firmware version	EeFWVersion

[1] The counter automatically cycles from 65535 to 0.
[2] The counter automatically cycles from 32767 to 0.

Metering/protection-manager event notification

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
603	1	R	-	-	INT	1..8000		H	number of first (oldest) record in the metering-manager event log (file N° 10)	CurrentFirstRecordOfMM_EvtLog
604	1	R	-	-	INT	1..8000		H	number of last (most recent) record in the metering-manager event log (file N° 10)	CurrentLastRecordOfMM_EvtLog
623	1	R	-	-	INT	1..8000		P/H	number of first (oldest) record in the protection-manager event log (file N° 20)	CurrentFirstRecordOfPM_EvtLog
624	1	R	-	-	INT	1..8000		P/H	number of last (most recent) record in the protection-manager event log (file N° 20)	CurrentLastRecordOfPM_EvtLog

Table of registers
Circuit-breaker manager @ xx

Cause of tripping

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
650	1	R	-	-	INT	0..65535	A/E	P/H	**b** 0x01: long-time protection. **b** 0x02: short-time protection **b** 0x04: instantaneous protection **b** 0x08: ground-fault protection **b** 0x10: earth-leakage protection **b** 0x20: DIN protection **b** 0x40: self-protection (temperature) **b** 0x80: self-protection (overvoltage) **b** 0x0100: self-protection (Micrologic A) or other protection (see register 651)	MitopBasActCause
651	1	R	-	-	INT	0..65535		P/H	status word indicating cause of tripping by protection functions: **b** 0x01: current unbalance **b** 0x02: Over current phase 1 **b** 0x04 Over current phase 2 **b** 0x08: Over current phase 3 **b** 0x10: Over current on Neutral **b** 0x20: Under voltage **b** 0x40: Over voltage **b** 0x80: voltage unbalance **b** 0x0100: Over power **b** 0x0200: reverse power **b** 0x0400: Under frequency **b** 0x0800: Over frequency **b** 0x1000: phase rotation **b** 0x2000: load shedding based on current **b** 0x4000: load shedding based on power	MitopAdvActCause

Table of registers
Circuit-breaker manager @ xx

Circuit-breaker status, Auto/Manu

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
661	1	R	-	-	Bitmap16	-	A/E	P/H	Circuit-breaker status: See next page	BrStatus
662	1	R	-	-	INT	0..65535	A/E	P/H	counter for total number of operations (OF): the counter increments when bit 0 in register 661 switches from 0 to 1.[1]	CtrOF_OvrLife
663	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (OF) since last reset: the counter increments when bit 0 in register 661 switches from 0 to 1.[1]	CtrOF
664	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (SD): the counter increments when bit 1 in register 661 switches from 0 to 1.[1]	CtrSD
665	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (SDE): the counter increments when bit 2 in register 661 switches from 0 to 1.[1]	CtrSDE
669	1	R	-	-	Bitmap16	0..65535	A/E	P/H	authorisation word for actuation by MX and XF auxiliaries: **b** when bit 1 and 3 are set, MX is authorised to actuate the circuit breaker **b** when bit 2 and 3 are set, XF is authorised to actuate the circuit breaker	CoilControl
670	1	R	-	-	INT	0..1		P/H	Auto/Manu mode: **b** 0, "Manu" mode: remote opening and closing of the circuit breaker are disabled **b** 1, "Auto" mode: remote opening and closing of the circuit breaker are enabled Auto/Manu mode can be modified on Micrologic P/H (only locally). Default value = 1	AutoManu

[1] *The counter automatically cycles from 65535 to 0.*

OF ON / OFF.
SD Trip indication.
SDE Fault-trip indication.

List of possible values for register 661 (circuit-breaker status) in the circuit-breaker manager

BrStatus bitmap detail :

Bit 0 (0x01) : OF ; Indication contacts
 For Compact and Masterpact : 0= Breaker is opened, 1 = Breaker is closed

Bit 1 (0x02) : SD ; Trip indication contact
 For Compact : 0 = no trip, 1 = Breaker has tripped due to electrical fault or Shunt trip
 For Masterpact : always 0

Bit 2 (0x04) : SDE ; Fault trip indication contact
 For Compact and Masterpact : 0 = no trip, 1 = Breaker has tripped due to electrical fa

Bit 3 (0x08) : CH ; Charged (used only with motor mechanism)
 For Compact : always 0
 For Masterpact : 0 = Spring discharged, 1 = Spring loaded

Bit 4 (0x10) : Reserved (internal use only)

Bit 5 (0x20) : Reserved (internal use only)

Bit 6 (0x40) : Compact / Masterpact differenciation
 0 = Compact NS , 1 = Masterpact

Bit 7-15 : Reserved

Nota : A bitmap mask should be used to test the Breaker status.
If a value test is used, the following values should be used for Mastepact :
0x44 Tripped discharged not RTC
0x4C Tripped charged not RTC
0x50 OFF discharged not RTC
0x51 ON discharged not RTC
0x59 ON charged RTC
0x78 OFF charged RTC

Table of registers
Circuit-breaker manager @ xx

Time stamping

register	nbr of registers	read/ write	scale	unit	format	Interval	A/E	P/H	description	label
671	3	R	-	-	DATE	-	A/E	P/H	date of last actuation of MX auxiliary	LastXFCoilActivationD_T
674	1	R	-	-	INT	0..65535	A/E	P/H	MX actuation counter [1]	CtrXFCoilActivation
675	3	R	-	-	DATE	-	A/E	P/H	date of last actuation of XF auxiliary	LastMXCoilActivationD_T
678	1	R	-	-	INT	0..65535	A/E	P/H	XF actuation counter [1]	CtrMXCoilActivation
679	4	R	-	-	XDATE	-	A/E	P/H	current date of circuit-breaker COM option	CurrentD_T
684	3	R	-	-	DATE	-	A/E	P/H	date of last circuit-breaker opening	LastOFContactOpenD_T
687	3	R	-	-	DATE	-	A/E	P/H	date of last circuit-breaker closing	LastOFContactCloseD_T
690	3	R	-	-	DATE	-	A/E	P/H	date of last trip without an electrical fault	LastSDContactSetD_T
693	3	R	-	-	DATE	-	A/E	P/H	date of last trip with an electrical fault	LastSDEContactSetD_T
696	3	R	-	-	DATE	-	A/E	P/H	date of last PAF (Ready To Close) closing	LastPAFContactSetD_T
699	3	R	-	-	DATE	-	A/E	P/H	date of last DLO (half moon) closing	LastDLOContactSetD_T
702	3	R	-	-	DATE	-	A/E	P/H	date of last AD (charged) closing	LastADContactSetD_T
705	3	R	-	-	DATE	-	A/E	P/H	date of last address change (register 531)	LastAddressChangeD_T
708	3	R	-	-	DATE	-	A/E	P/H	date of last reset of circuit-breaker COM option event log	LastCM_EvtLogReset D_T
711	4	R	-	-	XDATE	-	A/E	P/H	date when time for circuit-breaker COM option was last set	LastDateTimeSetD_T
715	1	R	-	-	INT	0..65535	A/E	P/H	counter for time setting for circuit-breaker COM option [1]	CtrDateTimeSets
800	1	R/W				0…1	A/E	P/H	Communication profile activation 0 = Not activated 1 = activated Default value = 0 [2]	
802	1	R					A/E	P/H	Open command status	
803	1	R					A/E	P/H	Close command status	

Event log of the circuit-breaker manager

Registers 718 → 740 file N° 30 (see the section : Access to the files)

[1] The counter automatically cycles from 65535 to 0.
[2] Communication profile is available only with a Breaker Communication Module firmware version greater or equal to V2.0 (register 577 must be greater or equal to 02000)

Configuration of the chassis manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
515	1	R	-	-	INT	15140	A/E	P/H	Square D Product Identification 15140 = Chassis Communication Module	EeSQD_Prod_ID
531	1	R/W	-	-	INT	51..97	A/E	P/H	MODBUS address of the COM option (@ xx + 50) Default value: 50+47=97	eeAdrBus
532	1	R/W	-	-	INT	0..1	A/E	P/H	Parity: **b** 0: no parity **b** 1: even parity Default value: 1	eeParityBus
533	1	R/W	-	-	INT	1200.. 38400	A/E	P/H	Baud rate: **b** 1200: 1200 baud **b** 2400: 2400 baud **b** 4800: 4800 baud **b** 9600: 9600 baud **b** 19200: 19200 baud **b** 38400: 38400 baud Default value: 19200	eeBaudRate

Identification of the chassis manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
534	2	R/W	-	-	ASCII	0x00.. 0x7F	A/E	P/H	short identifier of the chassis COM option coded over 4 ASCII characters Default value: 0x00	CCM_Loc
536	8	R/W	-	-	ASCII	0x00.. 0x7F	A/E	P/H	long identifier of the chassis COM option coded over 16 ASCII characters Default value: 0x00	CCM_NamePlate

Table of registers
Chassis manager @ xx + 50

Diagnostics counters and Control word

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
544	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to the slave (identical to function 8-14) [2]	CtrMsgSentThisUnit
545	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to other slaves [2]	CtrMsgSentOtherUnit
546	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – bus messages managed by the slave (identical to function 8-11) [2]	CtrMsgRX_ValidCRC
547	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter –bus errors managed by the slave (identical to function 8-12) [2]	CtrMsgRX_InvalidCRC
548	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – messages sent to the slave comprising a non-supported Modbus function [2]	CtrMsgRX_InvalidFC
549	1	R	-	-	INT	0..32767	A/E	P/H	Modbus event counter (identical to function 11) [2]	CtrModbusEvtCtr
550	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter –bus exception replies managed by the slave (identical to function 8-13) [2]	CtrExceptionReplies
551	1	R	-	-	INT	0..32767	A/E	P/H	Modbus diagnostics counter – broadcast messages received by the slave (identical to function 8-17) [2]	CtrMsgRX_Broadcast
553	1	R	-	-	INT	0..65535	A/E	P/H	Control word of the chassis manager. This Control word cannot be set by the user. It is randomly changed each time the system is energised. It is necessary to read the Control word before sending certain commands to the chassis manager.	Control word
554	1	R	-	-	INT	0..65535	A/E	P/H	Counter for number of times the circuit-breaker COM option is energised [1]	eeCtrPowerUp
555	1	R	-	-	INT	0..65535	A/E	P/H	Counter for the number of circuit-breaker COM option resets, whether following power loss or not. [1]	eeCtrReset
577	1	R	1	-	INT	-	A/E	P/H	Chassis Communication firmware version	EeFWVersion

[1] The counter automatically cycles from 65535 to 0.
[2] The counter automatically cycles from 32767 to 0.

Table of registers
Chassis manager @ xx + 50

Chassis status

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
661	1	R	-	-	Bitmap 16	-	A/E	P/H	device status: If bit 9 (0x0200) is set to 1, the device is connected. **CE** If bit 8 (0x0100) is set to 1, the device is disconnected. **CD** If bit 10 (0x400) is set to 1, the device is in the test postion. **CT**	ChassisStatus
662	1	R	-	-	INT	0..65535	A/E	P/H	counter for change to the "connected" position: the counter increments when bit 8 in register 661 switches from 0 to 1.[1]	CtrRackedIn
663	1	R	-	-	INT	0..65535	A/E	P/H	counter for change to the "disconnected" position: the counter increments when bit 9 in register 661 switches from 0 to 1.[1]	CtrRackedOut
664	1	R	-	-	INT	0..65535	A/E	P/H	counter for change to the "test" position: the counter increments when bit 10 in register 661 switches from 0 to 1.[1]	CtrTestPosition

[1] *The counter automatically cycles from 65535 to 0.*

Time-stamping

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
679	4	R	-	-	XDATE	-	A/E	P/H	current date of chassis COM option	CurrentD_T
684	3	R	-	-	DATE	-	A/E	P/H	date of the last change to the "connected" position	LastRackedInD_T
687	3	R	-	-	DATE	-	A/E	P/H	date of the last change to the "disconnected" position	LastRackedOutD_T
690	3	R	-	-	DATE	-	A/E	P/H	date of the last change to the "test" position	LastTestPositionD_T
705	3	R	-	-	DATE	-	A/E	P/H	date of the last change in address (register 531)	LastAddressChangeD_T
711	4	R	-	-	XDATE	-	A/E	P/H	date when time for chassis COM option was last set	LastDateTimeSetD_T
715	1	R	-	-	INT	0..65535	A/E	P/H	counter for time setting for chassis COM option	CtrDateTimeSets

Voltages

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1000	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-phase voltage V12	V_RMS[0]
1001	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-phase voltage V23	V_RMS[1]
1002	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-phase voltage V31	V_RMS[2]
1003	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-neutral voltage V1N. [1]	V_RMS[3]
1004	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-neutral voltage V2N. [1]	V_RMS[4]
1005	1	R	x 1	V	INT	0..1200	E	P/H	rms phase-to-neutral voltage V3N. [1]	V_RMS[5]
1006	1	R	x 1	V	INT	0..1200	E	P/H	arithmetic mean of the phase-to-phase voltages 1/3 x (V12+V23+V31).	V_AvRMS[0]
1007	1	R	x 1	V	INT	0..1200	E	P/H	arithmetic mean of the phase-to-neutral voltages 1/3 x (V1N+V2N+V3N). [1]	V_AvRMS[1]
1008	1	R	x10	%	INT	-1000.. +1000	E	P/H	V12 phase-to-phase voltage unbalance with respect to the arithmetic mean of the phase-to-phase voltages	V_Unbal[0]
1009	1	R	x10	%	INT	-1000.. +1000	E	P/H	V23 phase-to-phase voltage unbalance with respect to the arithmetic mean of the phase-to-phase voltages	V_Unbal[1]
1010	1	R	x10	%	INT	-1000.. +1000	E	P/H	V31 phase-to-phase voltage unbalance with respect to the arithmetic mean of the phase-to-phase voltages	V_Unbal[2]
1011	1	R	x10	%	INT	-1000.. +1000	E	P/H	V1N phase-to-neutral voltage unbalance with respect to the arithmetic mean of the phase-to-neutral voltages [1]	V_Unbal[3]
1012	1	R	x10	%	INT	-1000.. +1000	E	P/H	V2N phase-to-neutral voltage unbalance with respect to the arithmetic mean of the phase-to-neutral voltages [1]	V_Unbal[4]
1013	1	R	x10	%	INT	-1000.. +1000	E	P/H	V3N phase-to-neutral voltage unbalance with respect to the arithmetic mean of the phase-to-neutral voltages [1]	V_Unbal[5]
1014	1	R	x10	%	INT	-1000.. +1000	E	P/H	maximum phase-to-phase voltage unbalance value in registers 1008, 1009 and 1010	V_UnbalMax[0]
1015	1	R	x10	%	INT	-1000.. +1000	E	P/H	maximum phase-to-neutral voltage unbalance value in registers 1011, 1012 and 1013 [1]	V_UnbalMax[1]

[1] *Value not accessible when the configuration register 3314 selects type 31.*

Table of registers
Metering manager @ xx + 200

Currents

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1016	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 1.	I_RMS[0]
1017	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 2	I_RMS[1]
1018	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 3	I_RMS[2]
1019	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on the neutral[2]	I_RMS[3]
1020	1	R	x1	A	INT	0..32767	A/E	P/H	maximum rms current in registers 1016, 1017, 1018 and 1019	I_Max
1021	1	R	x1	A	INT	0..32767	A/E	P/H	ground-fault current If this current exceeds 32767 A, the register blocks at 32767 [3]	I_RMSGnd
1022	1	R	x1	mA	INT	0..32767	A/E	P/H	earth-leakage current If this current exceeds 32767 A, the register blocks at 32767 [4]	I_RMSVigi
1023	1	R	X1	A	INT	0..32767		H	Apparent current phase A (peak/ $\sqrt{2}$	I_APP[0]
1024	1	R	X1	A	INT	0..32767		H	Apparent current phase B (peak/ $\sqrt{2}$	I_APP[1]
1025	1	R	X1	A	INT	0..32767		H	Apparent current phase C (peak/ $\sqrt{2}$	I_APP[2]
1026	1	R	X1	A	INT	0..32767		H	Apparent current Neutral (peak/ $\sqrt{2}$	I_APP[3]
1027	1	R	x1	A	INT	0..32767	E	P/H	arithmetic mean of phase currents 1, 2 and 3: 1/3 x (I1+I2+I3)	I_Mean
1028	1	R	x10	%	INT	-1000.. +1000	E	P/H	I1 current unbalance with respect to the arithmetic mean of the phase currents	I_Unbal[0]
1029	1	R	x10	%	INT	-1000.. +1000	E	P/H	I2 current unbalance with respect to the arithmetic mean of the phase currents	I_Unbal[1]
1030	1	R	x10	%	INT	-1000.. +1000	E	P/H	I3 current unbalance with respect to the arithmetic mean of the phase currents	I_Unbal[2]
1031	1	R	x10	%	INT	-1000.. +1000	E	P/H	IN current unbalance with respect to the arithmetic mean of the phase currents [2]	I_Unbal[3]
1032	1	R	x10	%	INT	-1000.. +1000	E	P/H	maximum current unbalance in registers 1028, 1029 and 1030.	I_UnbalMax
1033	1	R	-	-	-	-		P/H	Reserved	

[2] *Value not accessible when the configuration register 3314 selects type 31 or 40.*
[3] *Accessible only with Micrologic 5.0 P/H and 6.0 A/P/H*
[4] *Accessible only with Micrologic 7.0 A/P/H*

Power

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	label
1034	1	R	x1	kW	INT	+/-0..32767	E	P/H	active power on phase 1 [1], [5]	ActivePwr[0]
1035	1	R	x1	kW	INT	+/-0..32767	E	P/H	active power on phase 2 [1], [5]	ActivePwr[1]
1036	1	R	x1	kW	INT	+/-0..32767	E	P/H	active power on phase 3 [1], [5]	ActivePwr[2]
1037	1	R	x1	kW	INT	+/-0..32767	E	P/H	total active power [5]	ActivePwr[3]
1038	1	R	x1	kVAR	INT	+/-0..32767	E	P/H	reactive power on phase 1 [1], [5]	ReactivePwr[0]
1039	1	R	x1	kVAR	INT	+/-0..32767	E	P/H	reactive power on phase 2 [1], [5]	ReactivePwr[1]
1040	1	R	x1	kVAR	INT	+/-0..32767	E	P/H	reactive power on phase 3 [1], [5]	ReactivePwr[2]
1041	1	R	x1	kVAR	INT	+/-0..32767	E	P/H	total reactive power [5]	ReactivePwr[3]
1042	1	R	x1	kVA	INT	0..32767	E	P/H	apparent power on phase 1 with 3 wattmeters [1]	ApparentPwr[0]
1043	1	R	x1	kVA	INT	0..32767	E	P/H	apparent power on phase 2 with 3 wattmeters [1]	ApparentPwr[1]
1044	1	R	x1	kVA	INT	0..32767	E	P/H	apparent power on phase 3 with 3 wattmeters [1]	ApparentPwr[2]
1045	1	R	x1	kVA	INT	0..32767	E	P/H	total apparent power	ApparentPwr[3]

[1] Value not accessible when the configuration register 3314 selects type 31.
[5] The sign of the active and reactive power depends on configuration register 3316.

Power factor

register	nbr of registers	read/write	scale	unit	format	Interval	A/E	P/H	description	label
1046	1	R	x1000	none	INT	-1000..+1000	E	P/H	power factor on phase 1 (absolute value equal to |P|/S) [1], [6]	PF[0]
1047	1	R	x1000	none	INT	-1000..+1000	E	P/H	power factor on phase 2 (absolute value equal to |P|/S) [1], [6]	PF[1]
1048	1	R	x1000	none	INT	-1000..+1000	E	P/H	power factor on phase 3 (absolute value equal to |P|/S) [1], [6]	PF[2]
1049	1	R	x1000	none	INT	-1000..+1000	E	P/H	total power factor (absolute value equal to |Ptotal|/Stotal) [6]	PF[3]
1050	1	R	x1000	none	INT	-1000..+1000		H	Fundamental power factor (its absolute value is equal to |FundP|/FundS). Sign convention the same as the one for the real power factor. N/A if type 31 network.	FundPF[0]
1051	1	R	x1000	none	INT	-1000..+1000		H	same as above phase B.	FundPF[1]
1052	1	R	x1000	none	INT	-1000..+1000		H	same as above phase C.	FundPF[2]
1053	1	R	x1000	none	INT	-1000..+1000	E	H	Total fundamental power factor (its absolute value is equal to |FundPtot|/FundStot). Sign convention the same as the one for the real power factor.	FundPF[3]

[1] Value not accessible when the configuration register 3314 selects type 31.
[6] The sign of the power factor depends on configuration register 3318.

Table of registers
Metering manager @ xx + 200

Frequency

register	nbr of registers	read/ write	scale	unit	format	Interval	A/E	P/H	description	label
1054	1	R	x10	Hz	INT	0..4000	E	P/H	system frequency	Frequency
1055	1	R	X .001	s	INT	0..32767		P/H	Duration of the interval between the last update of real time values and the current table (about 1s)	UpdateIval

Fundamental

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1056	1	R	D	V	INT	0..1200		H	Fundamental (RMS) of phase-to-phase voltage Vab.	FundV_RMS[0]
1057	1	R	D	V	INT	0..1200		H	same as above Vbc.	FundV_RMS[1]
1058	1	R	D	V	INT	0..1200		H	same as above Vba.	FundV_RMS[2]
1059	1	R	D	V	INT	0..1200		H	Fundamental (RMS) of phase-to-neutral voltage Van. – N/A if type 31 network	FundV_RMS[3]
1060	1	R	D	V	INT	0..1200		H	same as above Vbn	FundV_RMS[4]
1061	1	R	D	V	INT	0..1200		H	same as above Vcn	FundV_RMS[5]
1062	6	R	-	-	-	-		H	Reserved.	ReservedA
1068	1	R	A	A	INT	0..32767		H	Fundamental (RMS) of Phase A current.	FundI_RMS[0]
1069	1	R	A	A	INT	0..32767		H	same as above phase B. Measured with type 31.	FundI_RMS[1]
1070	1	R	A	A	INT	0..32767		H	same as above phase C	FundI_RMS[2]
1071	1	R	B	A	INT	0..32767		H	same as above Neutral. – N/A with type 31, 40 networks. Measured with type 41.	FundI_RMS[3]
1072	4	R	-	-	-	-		H	Reserved	
1076	1	R	E	kW	INT	0..32767		H	Phase A fundamental active power with 3 wattmeters (type 40 & 41) N/A for type 31. Same sign convention as with active power.	FundActivePwr[0]
1077	1	R	E	KW	INT	0..32767		H	Phase B fundamental active power with 3 wattmeters (type 40 & 41) N/A for type 31. Same sign convention as with active power.	FundActivePwr[1]
1078	1	R	E	KW	INT	0..32767		H	Phase C fundamental active power with 3 wattmeters (type 40 & 41) N/A for type 31.Same sign convention as with active power.	FundActivePwr[2]
1079	1	R	E	kW	INT	0..32767		H	Total fundamental active power. Same sign convention as with active power.	FundActivePwr[3]
1080	1	R	E	kVAR	INT	0..32767		H	Phase A fundamental reactive power with 3 wattmeters (type 40 & 41) N/A for type 31.	FundReactivePwr[0]
1081	1	R	E	kVAR	INT	0..32767		H	Phase B fundamental reactive power with 3 wattmeters (type 40 & 41) N/A for type 31.	FundReactivePwr[1]

Table of registers
Metering manager @ xx + 200

Fundamental

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1082	1	R	E	kVAR	INT	0..32767		H	Phase C fundamental reactive power with 3 wattmeters (type 40 & 41) N/A for type 31.	FundReactivePwr[2]
1083	1	R	E	kVAR	INT	0..32767		H	Total fundamental reactive power.	FundReactivePwr[3]
1084	1	R	E	kVA	INT	0..32767		H	Phase A fundamental apparent power. N/A for type 31	FundApparentPwr[0]
1085	1	R	E	KVA	INT	0..32767		H	Phase B fundamental apparent power. N/A for type 31.	FundApparentPwr[1]
1086	1	R	E	KVA	INT	0..32767		H	Phase C fundamental apparent power. N/A for type 31.	FundApparentPwr[2]
1087	1	R	E	kVA	INT	0..32767		H	Total fundamental apparent power.	FundApparentPwr[3]
1088	1	R	E	kVAR	INT	0..32767		H	Phase A distortion power. N/A for type 31.	DistortionPwr[0]
1089	1	R	E	kVAR	INT	0..32767		H	Phase B distortion power. N/A for type 31.	DistortionPwr[1]
1090	1	R	E	kVAR	INT	0..32767		H	Phase C distortion power. N/A for type 31.	DistortionPwr[2]
1091	1	R	E	kVAR	INT	0..32767		H	Total distortion power.	DistortionPwr[3]

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Total Harmonic Distortion

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1092	1	R	x10	%	INT	0..5000	E	H	Total harmonic distortion of Vab voltage compared to the fundamental.	THD_V[0]
1093	1	R	x10	%	INT	0..5000	E	H	same as above Vbc	THD_V[1]
1094	1	R	x10	%	INT	0..5000	E	H	same as above Vba	THD_V[2]
1095	1	R	x10	%	INT	0..5000	E	H	Total harmonic distortion of Van voltage compared to the fundamental. – N/A with type 31 network.	THD_V[3]
1096	1	R	x10	%	INT	0..5000	E	H	same as above Vbn	THD_V[4]
1097	1	R	x10	%	INT	0..5000	E	H	same as above Vcn	THD_V[5]
1098	1	R	x10	%	INT	0..5000	E	H	Total harmonic distortion of phase A current compared to the fundamental.	THD_I[0]
1099	1	R	x10	%	INT	0..5000	E	H	same as above phase B. Measured with type 31.	THD_I[1]
1100	1	R	x10	%	INT	0..5000	E	H	same as above phase C	THD_I[2]
1101	1	R	x10	%	INT	0..5000	E	H	same as above Neutral – N/A with type 31 networks. Measured with type 41, calculated with type 40.	THD_I[3]
1102	1	R	x10	%	INT	0..1000	E	H	Total harmonic distortion of Vab voltage compared to the RMS value.	thd_V[0]
1103	1	R	x10	%	INT	0..1000	E	H	same as above Vbc	thd_V[1]
1104	1	R	x10	%	INT	0..1000	E	H	same as above Vba	thd_V[2]
1105	1	R	x10	%	INT	0..1000	E	H	Total harmonic distortion of Van voltage compared to the RMS value. – N/A with type 31 network.	thd_V[3]
1106	1	R	x10	%	INT	0..1000	E	H	same as above Vbn	thd_V[4]
1107	1	R	x10	%	INT	0..1000	E	H	same as above Vcn	thd_V[5]
1108	1	R	x10	%	INT	0..1000	E	H	Total hamronic distortion of phase A current compared to the RMS value.	thd_I[0]
1109	1	R	x10	%	INT	0..1000	E	H	same as above phase B. Measured with type 31.	thd_I[1]
1110	1	R	x10	%	INT	0..1000	E	H	same as above phase C	thd_I[2]
1111	1	R	x10	%	INT	0..1000	E	H	same as above Neutral – N/A with type 31 networks. Measured with type 41, calculated with type 40.	thd_I[3]
1112	1	R	x10	Deg	INT	0..3600		H	Phase shift Vab / Ia with type 31 ; Van / Ia with type 40 & 41.	FundVI_Angle[0]
1113	1	R	x10	Deg	INT	0..3600		H	Phase shift Vbc / Ib with type 31 ; Vbn / Ib with type 40 & 41.	FundVI_Angle[1]
1114	1	R	x10	Deg	INT	0..3600		H	Phase shift Vca / Ic with type 31 ; Vcn / Ic with type 40 & 41.	FundVI_Angle[2]
1115	1	R	x10	None	INT	0..1000		H	Phase A K-factor. N/A in 400Hz nominal freq. networks.	I_Kfactor[0]
1116	1	R	x10	None	INT	0..1000		H	Phase B K-factor. N/A in 400Hz nominal freq. networks.	I_Kfactor[1]
1117	1	R	x10	None	INT	0..1000		H	Phase C K-factor. N/A in 400Hz nominal freq. networks.	I_Kfactor[2]
1118	1	R	x10	None	INT	0..1000		H	Neutral K-factor. – N/A with type 30 and 31 networks. N/A in 400Hz nominal freq. Networks.	I_Kfactor[3]
1119	1	R	x100	None	INT	0..10000		H	Vab voltage peak factor. – N/A with type 40 and 41 networks. – N/A in 400Hz config	V_Crest[0]

Total Harmonic Distortion

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
1120	1	R	x100	None	INT	0..10000		H	Vbc voltage peak factor. – N/A with type 40 and 41 networks. – N/A in 400Hz config	V_Crest[1]
1121	1	R	x100	None	INT	0..10000		H	Vca voltage peak factor. – N/A with type 40 and 41 networks. – N/A in 400Hz config	V_Crest[2]
1122	1	R	x100	None	INT	0..10000		H	Van voltage peak factor. – N/A with type 31 networks. – N/A in 400Hz config	V_Crest[3]
1123	1	R	x100	None	INT	0..10000		H	Vbn voltage peak factor. – N/A with type 31 networks. – N/A in 400Hz config	V_Crest[4]
1124	1	R	x100	None	INT	0..10000		H	Vcn voltage peak factor. – N/A with type 31 networks. – N/A in 400Hz config	V_Crest[5]
1125	1	R	x100	None	INT	0..10000		H	Phase A current peak factor. – N/A in 400Hz config	I_Crest[0]
1126	1	R	x100	None	INT	0..10000		H	Phase B current peak factor. – N/A in 400Hz config	I_Crest[1]
1127	1	R	x100	None	INT	0..10000		H	Phase C current peak factor. – N/A in 400Hz config	I_Crest[2]
1128	1	R	x100	None	INT	0..10000		H	Neutral current peak factor. – N/A with type 31, 40 networks. Measured with type 41. – N/A in 400Hz config	I_Crest[3]
1129	4	R	-	-	-	-		H	Reserved	
1133	1	R	x10	Deg	INT	0..3600		H	Phase shift Vab / Vab with type 31 ; Van / Van with type 40 & 41. Definition leads to content being always 0.	FundVV[0]
1134	1	R	x10	Deg	INT	0..3600		H	Phase shift Vbc / Vab with type 31 ; Vbn / Van with type 40 & 41. Under phase balanced conditions, equals 240 degrees	FundVV[1]
1135	1	R	x10	Deg	INT	0..3600		H	Phase shift Vca / Vab with type 31 ; Vcn / Van with type 40 & 41. Under phase balanced conditions, equals 120 degrees.	FundVV[2]

Registers 1300 to 1599: minimum values of the real-time measurements from 1000 to 1299
The minimum values for the real-time measurements may be accessed at the registers of the real-time values + 300. (available with Micrologic P and H)

Registers 1600 to 1899: maximum values of the real-time measurements from 1000 to 1299
The maximum values for the real-time measurements may be accessed at the registers of the real-time values + 600. (available with Micrologic P and H)

Table of registers
Metering manager @ xx + 200

Energy

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
2000	4	R	x1	kWh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	total active energy [2]	EeActiveEnergy
2004	4	R	x1	kvarh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	total reactive energy [2]	EeReactiveEnergy
2008	4	R	x1	kWh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	active energy positively incremented: [1]	EeActiveEnergyIn
2012	4	R	x1	kWh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	active energy negatively incremented: [1]	EeActiveEnergyOut
2016	4	R	x1	kvarh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	reactive energy positively incremented [1]	EeReactiveEnergyIn
2020	4	R	x1	kvarh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	reactive energy negatively incremented: [1]	EeReactiveEnergyOut
2024	4	R	x1	kVAh	MOD 10000	0..+ 9999 9999 9999 9999	E	P/H	total apparent energy	EeApparentEnergy

[1] The Energy in and Energy out values are incremented according to the power sign set in the Micrologic menu « Micrologic set-up » (See register 3316)

[2] As standard, the total calculated energy values are absolute total values. They represent the sum of the enrgy in and out values.
EP = EP in + EP out
EQ = EQ in + EQ out

Demand current

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
2200	1	R	x1	A	INT	0..32767	E	P/H	current demand on phase 1	I_Dmd[0]
2201	1	R	x1	A	INT	0..32767	E	P/H	current demand on phase 2	I_Dmd[1]
2202	1	R	x1	A	INT	0..32767	E	P/H	current demand on phase 3	I_Dmd[2]
2203	1	R	x1	A	INT	0..32767	E	P/H	current demand on the neutral [2]	I_Dmd[3]
2204	1	R	x1	A	INT	0..32767	E	P/H	current demand maximum on phase 1 since the last reset	nvI_DmdPk[0]
2205	1	R	x1	A	INT	0..32767	E	P/H	current demand maximum on phase 2 since the last reset	nvI_DmdPk[1]
2206	1	R	x1	A	INT	0..32767	E	P/H	current demand maximum on phase 3 since the last reset	nvI_DmdPk[2]
2207	1	R	x1	A	INT	0..32767	E	P/H	current demand maximum on the neutral since the last reset [2]	nvI_DmdPk[3]

[2] *Value not accessible when the configuration register 3314 selects type 31 or 40.*

K-factor demand

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
2212	1	R	x10	None	INT	0..1000		H	K-factor demand, phase A.	K_Dmd[0]
2213	1	R	x10	None	INT	0..1000		H	same as above Phase B.	K_Dmd[1]
2214	1	R	x10	None	INT	0..1000		H	same as above Phase C.	K_Dmd[2]
2215	1	R	x10	None	INT	0..1000		H	same as above Neutral. N/A with type 31 or 40 network.	K_Dmd[3]
2216	1	R	x10	None	INT	0..1000		H	K-factor demand peak, phase A, since last reset.	nvK_DmdPk[0]
2217	1	R	x10	None	INT	0..1000		H	same as above Phase B.	nvK_DmdPk[1]
2218	1	R	x10	None	INT	0..1000		H	same as above Phase C.	nvK_DmdPk[2]
2219	1	R	x10	None	INT	0..1000		H	same as above Neutral. N/A with type 31 or 40 network.	nvK_DmdPk[3]

Table of registers
Metering manager @ xx + 200

Demand power

register	nbr of registers	read/ write	scale	unit	form at	interval	A/E	P/H	description	label
2224	1	R	x1	kW	INT	0..32767	E	P/H	total active-power demand [7]	**ActivePwrDmd**
2225	1	R	x1	kW	INT	0..32767		P/H	active-power demand maximum since the last reset	NvActivePwrDmdPk
2226	1	R	x1	kW	INT	0..32767		P/H	predicted active-power demand at the end of the window [8]	ActivePwrDmdPred
2227	1	R	x1000	sans	INT	-1000.. +1000		P/H	total power factor at last active-power demand maximum	NvPF_atActivePwrD mdPk
2228	1	R	x1	kVAR	INT	0..32767		P/H	value of reactive-power demand at last active-power demand maximum	NvkVAR_atActivePwr DmdPk
2229	1	R	x1	kVA	INT	0..32767		P/H	value of apparent-power demand at last active-power demand maximum	NvkVA_atActivePwr DmdPk
2230	1	R	x1	kVAR	INT	0..32767	E	P/H	total reactive-power demand [7]	**ReactivePwrDmd**
2231	1	R	x1	kVAR	INT	0..32767		P/H	reactive-power demand maximum since the last reset	NvReactivePwrDmdPk
2232	1	R	x1	kVAR	INT	0..32767		P/H	predicted reactive-power demand at the end of the window [8]	ReactivePwrDmdPred
2233	1	R	x1000	sans	INT	-1000.. +1000		P/H	total power factor at last reactive-power demand maximum	NvPF_atReactivePwr DmdPk
2234	1	R	x1	kW	INT	0..32767		P/H	value of active-power demand at last reactive-power demand maximum	NvkW_atReactivePwr DmdPk
2235	1	R	x1	kVA	INT	0..32767		P/H	value of apparent-power demand at last reactive-power demand maximum	NvkVA_atReactivePwr DmdPk
2236	1	R	x1	kVA	INT	0..32767	E	P/H	total apparent power demand [7]	**ApparentPwrDmd**
2237	1	R	x1	kVA	INT	0..32767		P/H	apparent-power demand maximum since the last reset	NvApparentPwrDmd Pk
2238	1	R	x1	kVA	INT	0..32767		P/H	predicted apparent-power demand at the end of the window [8]	ApparentPwrDmdPred
2239	1	R	x1000	sans	INT	-1000.. +1000		P/H	total power factor at last apparent-power demand maximum	NvPF_atApparentPwr DmdPk
2240	1	R	x1	kW	INT	0..32767		P/H	value of active-power demand at last apparent-power demand maximum	NvkW_atApparentPwr DmdPk
2241	1	R	x1	kVAR	INT	0..32767		P/H	value of reactive-power demand at last apparent-power demand maximum	NvkVAR_atApparent PwrDmdPk

[7] *Value updated at end of window for the "block" mode. For the "sliding" mode, the value is updated every 15 seconds.*
[8] *Value updated every 15 seconds for both "block" and "sliding" modes.*

Table of registers
Metering manager @ xx + 200

Time stamping

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
3000	4	R	-	-	DATE	-		P/H	current date of the metering manager	XtedDateTime
3005	3	R	-	-	DATE	-		P/H	date of last current demand maximum I1 (register 2204)	nvI_DmdPk[0]
3008	3	R	-	-	DATE	-		P/H	date of last current demand maximum I2 (register 2205)	nvI_DmdPk[1]
3011	3	R	-	-	DATE	-		P/H	date of last current demand maximum I3 (register 2206)	nvI_DmdPk[2]
3014	3	R	-	-	DATE	-		P/H	date of last current demand maximum on the neutral (register 2207) [2]	nvI_DmdPk[3]
3017	3	R	-	-	DATE	-		P/H	date of last active-power demand maximum (register 2224)	NvActivePwrDmdPk
3020	3	R	-	-	DATE	-		P/H	date of last reactive-power demand maximum (register 2230)	NvReactivePwrDmdPk
3023	3	R	-	-	DATE	-		P/H	date of last apparent-power demand maximum (register 2236)	NvApparentPwrDmdPk
3026	3	R	-	-	DATE	-		P/H	date of last reset of current demand maximum values	NvLastI_DmdReset
3029	3	R	-	-	DATE	-		P/H	date of last reset of power demand maximum values	NvLastPwrDmdReset
3032	3	R	-	-	DATE	-		P/H	Date-Time of last min registers reset (1300-1599). [*]	nvLastMinReset
3035	3	R	-	-	DATE	-		P/H	Date-Time of last max registers reset (1600-1899). [*]	nvLastMaxReset
3038	3	R	-	-	DATE	-		P/H	date of last reset of energy meters	NvLastEnReset
3041	3	R	-	-	DATE	-		P/H	Date of appearance of last K-factor demand peak (phase A)	nvK_DmdPk[0]
3044	3	R	-	-	DATE	-		P/H	Date of appearance of last K-factor demand peak (phase B)	nvK_DmdPk[1]
3047	3	R	-	-	DATE	-		P/H	Date of appearance of last K-factor demand peak (phase C)	nvK_DmdPk[2]
3050	3	R	-	-	DATE	-		P/H	Date of appearance of last K-factor demand peak (Neutral) N/A for type 31 & 40 networks	nvK_DmdPk[3]
3053	3	R	-	-	DATE	-		P/H	Date of appearance of last I^2 demand peak (phase A)	NvI2_DmdPk[0]
3056	3	R	-	-	DATE	-		P/H	Date of appearance of last I^2 demand peak (phase B)	NvI2_DmdPk[1]
3059	3	R	-	-	DATE	-		P/H	Date of appearance of last I^2 demand peak (phase C)	NvI2_DmdPk[2]
3062	3	R	-	-	DATE	-		P/H	Date of appearance of last I^2 demand peak (Neutral) N/A for type 31 & 40 networks	NvI2_DmdPk[3]

[2] *N/A for type 31 or 40 networks.*

[*] *Caution: this register is updated whenever any of the min register is reset. Command interface authorizes user to clear min of Current RMS & Unbal values, Voltage RMS & Unbal values, frequency, P/Q/S/PF, Fundamental quantities & THD, Voltage Crest & Current crest independently. However, since only one date/time of last reset is maintained, it is recommended to always set all bits in the command that resets min values.*

Table of registers
Metering manager @ xx + 200

Configuration of the metering manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
3300	1	R	-	-	INT	0..65535		P/H	Control word for the metering manager. This Control word may not be user set. It is randomly modified and must be read before sending certain commands to the metering manager.	Control word
3303	2	R/W	-	-	ASCII	0x00.. 0x7F		P/H	short identifier of the metering manager, coded over four ASCII characters. Default value: "set!"	nvUnitLabel
3305	8	R/W	-	-	ASCII	0x00.. 0x7F		P/H	long identifier of the metering manager, coded over 16 ASCII characters. Default value: "please set me up"	nvUnitNamePlate
3314	1	R/W	-	-	INT	{31, 40, 41}		P/H	selection of the calculation algorithm If you have a system type : 3 Phase, 3 Wire, 3 Current Transformer (3P breaker without External Neutral CT connected, Neutral not connected to VN), select system type **31**: measurement of the phase-to-phase voltages is available measurement of the phase-to-neutral voltagesi s not available measurement of the neutral current is not available. If you have a system type : 3 Phase, 4 Wire, 3 Current Transformer (3P breaker without External Neutral CT connected, Neutral connected to VN), select system type **40**: measurement of the phase-to-phase voltages is available measurement of the phase-to-neutral voltages is available measurement of the neutral current is not available. If you have a system type : 3 Phase, 4 Wire, 4 Current Transformer (3P breaker witht External Neutral CT connected or 4P breaker, Neutral connected to VN), select system type **41**: measurement of the phase-to-phase voltages is available measurement of the phase-to-neutral voltages is available measurement of the neutral current is available. Default value: type 41	NvSystemType
3316	1	R/W	-	-	INT	{0,1}		P/H	sign convention for the power: **b** 0: "+" if the active power flows from upstream (top) to downstream (bottom) (⇓) **b** 1: "+" if the active power flows from downstream (bottom) to upstream (top) (⇑). Default value: 0	NvConvPwrSign

Configuration

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
3317	1	R/W	-	-	INT	{0,1}		P/H	sign convention for the reactive power and the power factor: **b** 0: alternate IEEE convention **b** 1: IEEE & IEC convention Default value: 1 [8]	NvConvReactivePwrsign
3318	1	R/W	-	-	INT	{0,1,2}		P/H	sign convention for the reactive power and the power factor: **b** 0: IEC convention **b** 1: alternate IEEE convention **b** 2: IEEE convention Default value: 2 [8]	NvConvPFSign
3319	1	R/W	-	-	INT	{0,1}		H	ELU: N/A Reactive power calculationconvention: **b** 0: fundamental alone. **b** 1: harmonics included [DEFAULT].	nvConvReactivePwrCalc
3324	1	R/W	-	-	INT	{0,1}		P/H	Total energy metering convention: **b** 0: absolute accumulation (E=E+ + E-) **b** 1: signed accumulation (E=E+ - E-) Default = 0 : Absolute	nvEnAccumulationMode
3351	1	R/W	-	-	INT			P/H	Current-demand calculation method ; window type : **b** 0: Block interval ; sliding **b** 1: Thermal ; sliding Default value: 1	NvDmdMethod_I
3352	1	R/W	x1	min	INT	5..60		P/H	duration in minutes of the current-demand calculation window Default value: 15 minutes [9]	NvDmdIval_I
3354	1	R/W	-	-	INT			P/H	Power-demand calculation method ; window type : **b** 0: Block interval ; sliding **b** 1: Thermal ; sliding **b** 2: block interval ; block **b** 5: Synchronised to communication Default value: 0	NvDmdMethod_Pwr
3355	1	R/W	x1	min	INT	5..60		P/H	duration in minutes of the power-demand calculation window Default value: 15 minutes	NvDmdIval_Pwr
3816	1	R	-	-	INT	0..32767	A/E	P/H	Square D Identification number : Micrologic A : PM = 15131 P : PM = 15133, MM = 15134 H : PM = 15135, MM = 15136	EeSQD_Prod_ID

[8] To have IEE alt., set 3317 to 0 and 3318 to 1
To have IEC., set 3317 to 1 and 3318 to 0
To have IEEE., set 3317 to 1 and 3318 to 2

[9] The duration in minutes of the current-demand calculation window set in this register is used for the maximum current I1, I2, I3 and IN protection functions.
When these protection functions are active, it is possible to modify the duration of the caculation window whether the protective cover for the dial settings is closed or not, whether remote access is authorised (Micrologic) or not, and whether the supervisor knows the the remote-access control word or not.

Spectral Components (odd rank)

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
4100	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Vab. – N/A in 400Hz systems	V_h3[0]
4101	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Vbc. – N/A in 400Hz systems	V_h3[1]
4102	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Vca. – N/A in 400Hz systems	V_h3[2]
4103	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Van. – N/A in 400Hz systems – N/A with type 31	V_h3[3]
4104	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Vbn. – N/A in 400Hz systems – N/A with type 31	V_h3[4]
4105	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Vcn. – N/A in 400Hz systems – N/A with type 31	V_h3[5]
4106	6	R	x10	%	INT	0..1200		H	same as above harmonic 5	V_h5[..]
4112	6	R	x10	%	INT	0..1200		H	same as above harmonic 7	V_h7[..]
4118	6	R	x10	%	INT	0..1200		H	same as above harmonic 9	V_h9[..]
4124	6	R	x10	%	INT	0..1200		H	same as above harmonic 11	V_h11[..]
4130	6	R	x10	%	INT	0..1200		H	same as above harmonic 13	V_h13[..]
4136	6	R	x10	%	INT	0..1200		H	same as above harmonic 15	V_h15[..]
4142	6	R	x10	%	INT	0..1200		H	same as above harmonic 17	V_h17[..]
4148	6	R	x10	%	INT	0..1200		H	same as above harmonic 19	V_h19[..]
4154	6	R	x10	%	INT	0..1200		H	same as above harmonic 21	V_h21[..]
4160	6	R	x10	%	INT	0..1200		H	same as above harmonic 23	V_h23[..]
4166	6	R	x10	%	INT	0..1200		H	same as above harmonic 25	V_h25[..]
4172	6	R	x10	%	INT	0..1200		H	same as above harmonic 27	V_h27[..]
4178	6	R	x10	%	INT	0..1200		H	same as above harmonic 29	V_h29[..]
4184	6	R	x10	%	INT	0..1200		H	same as above harmonic 31	V_h31[..]
4190	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Ia. – N/A in 400Hz systems	I_h3[0]
4191	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Ib. – N/A in 400Hz systems	I_h3[1]
4192	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of Ic. – N/A in 400Hz systems	I_h3[2]
4193	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 3 of In. – N/A in 400Hz systems – N/A with type 31	I_h3[3]
4194	4	R	x10	%	INT	0..32767		H	same as above harmonic 5	I_h5[..]
4198	4	R	x10	%	INT	0..32767		H	same as above harmonic 7	I_h7[..]
4202	4	R	x10	%	INT	0..32767		H	same as above harmonic 9	I_h9[..]
4206	4	R	x10	%	INT	0..32767		H	same as above harmonic 11	I_h11[..]
4210	4	R	x10	%	INT	0..32767		H	same as above harmonic 13	I_h13[..]
4214	4	R	x10	%	INT	0..32767		H	same as above harmonic 15	I_h15[..]
4218	4	R	x10	%	INT	0..32767		H	same as above harmonic 17	I_h17[..]

Spectral Components (odd rank)

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
4222	4	R	x10	%	INT	0..32767		H	same as above harmonic 19	I_h19[..]
4226	4	R	x10	%	INT	0..32767		H	same as above harmonic 21	I_h21[..]
4230	4	R	x10	%	INT	0..32767		H	same as above harmonic 23	I_h23[..]
4234	4	R	x10	%	INT	0..32767		H	same as above harmonic 25	I_h25[..]
4238	4	R	x10	%	INT	0..32767		H	same as above harmonic 27	I_h27[..]
4242	4	R	x10	%	INT	0..32767		H	same as above harmonic 29	I_h29[..]
4246	4	R	x10	%	INT	0..32767		H	same as above harmonic 31	I_h31[..]
4250	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Vab. – N/A in 400Hz systems	V_Phi3[0]
4251	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Vbc. – N/A in 400Hz systems	V_Phi3[1]
4252	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Vca. – N/A in 400Hz systems	V_Phi3[2]
4253	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Van. – N/A in 400Hz systems – N/A with type 31	V_Phi3[3]
4254	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Vbn. – N/A in 400Hz systems – N/A with type 31	V_Phi3[4]
4255	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Vcn. – N/A in 400Hz systems – N/A with type 31	V_Phi3[5]
4256	6	R	x10	Deg	INT	0..3600		H	same as above harmonic 5	V_Phi5[..]
4262	6	R	x10	Deg	INT	0..3600		H	same as above harmonic 7	V_Phi7[..]
4340	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Ia. – N/A in 400Hz systems	I_Phi3[0]
4341	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Ib. – N/A in 400Hz systems	I_Phi3[1]
4342	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of Ic. – N/A in 400Hz systems	I_Phi3[2]
4343	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 3 of In. – N/A in 400Hz systems – N/A with type 31	I_Phi3[3]
4344	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 5	I_Phi5[..]
4348	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 7	I_Phi7[..]
4352	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 9	I_Phi9[..]

Spectral Components (even rank)

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
4400	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Vab. – N/A in 400Hz systems	V_h2[0]
4401	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Vbc. – N/A in 400Hz systems	V_h2[1]
4402	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Vca. – N/A in 400Hz systems	V_h2[2]
4403	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Van. – N/A in 400Hz systems – N/A with type 31	V_h2[3]
4404	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Vbn. – N/A in 400Hz systems – N/A with type 31	V_h2[4]
4405	1	R	x10	%	INT	0..1200		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Vcn. – N/A in 400Hz systems – N/A with type 31	V_h2[5]
4406	6	R	x10	%	INT	0..1200		H	same as above harmonic 4	V_h4[..]
4412	6	R	x10	%	INT	0..1200		H	same as above harmonic 6	V_h6[..]
4418	6	R	x10	%	INT	0..1200		H	same as above harmonic 8	V_h8[..]
4424	6	R	x10	%	INT	0..1200		H	same as above harmonic 10	V_h10[..]
4430	6	R	x10	%	INT	0..1200		H	same as above harmonic 12	V_h12[..]
4436	6	R	x10	%	INT	0..1200		H	same as above harmonic 14	V_h14[..]
4442	6	R	x10	%	INT	0..1200		H	same as above harmonic 16	V_h16[..]
4448	6	R	x10	%	INT	0..1200		H	same as above harmonic 18	V_h18[..]
4454	6	R	x10	%	INT	0..1200		H	same as above harmonic 20	V_h20[..]
4460	6	R	x10	%	INT	0..1200		H	same as above harmonic 22	V_h22[..]
4466	6	R	x10	%	INT	0..1200		H	same as above harmonic 24	V_h24[..]
4472	6	R	x10	%	INT	0..1200		H	same as above harmonic 26	V_h26[..]
4478	6	R	x10	%	INT	0..1200		H	same as above harmonic 28	V_h28[..]
4484	6	R	x10	%	INT	0..1200		H	same as above harmonic 30	V_h30[..]
4490	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Ia. – N/A in 400Hz systems	I_h2[0]
4491	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Ib. – N/A in 400Hz systems	I_h2[1]
4492	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of Ic. – N/A in 400Hz systems	I_h2[2]
4493	1	R	x10	%	INT	0..32767		H	% value (in respect with the fundamental) of the amplitude of harmonic 2 of In. – N/A in 400Hz systems – N/A with type 31	I_h2[3]
4494	4	R	x10	%	INT	0..32767		H	same as above harmonic 4	I_h4[..]
4498	4	R	x10	%	INT	0..32767		H	same as above harmonic 6	I_h6[..]
4502	4	R	x10	%	INT	0..32767		H	same as above harmonic 8	I_h8[..]
4506	4	R	x10	%	INT	0..32767		H	same as above harmonic 10	I_h10[..]
4510	4	R	x10	%	INT	0..32767		H	same as above harmonic 12	I_h12[..]
4514	4	R	x10	%	INT	0..32767		H	same as above harmonic 14	I_h14[..]
4518	4	R	x10	%	INT	0..32767		H	same as above harmonic 16	I_h16[..]

Spectral Components (even rank)

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
4522	4	R	x10	A	INT	0..32767		H	same as above harmonic 18	I_h18[..]
4526	4	R	x10	A	INT	0..32767		H	same as above harmonic 20	I_h20[..]
4530	4	R	x10	A	INT	0..32767		H	same as above harmonic 22	I_h22[..]
4534	4	R	x10	A	INT	0..32767		H	same as above harmonic 24	I_h24[..]
4538	4	R	x10	A	INT	0..32767		H	same as above harmonic 26	I_h26[..]
4542	4	R	x10	A	INT	0..32767		H	same as above harmonic 28	I_h28[..]
4546	4	R	x10	A	INT	0..32767		H	same as above harmonic 30	I_h30[..]
4550	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Vab. – N/A in 400Hz systems	V_Phi2[0]
4551	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Vbc. – N/A in 400Hz systems	V_Phi2[1]
4552	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Vca. – N/A in 400Hz systems	V_Phi2[2]
4553	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Van. – N/A in 400Hz systems – N/A with type 31	V_Phi2[3]
4554	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Vbn. – N/A in 400Hz systems – N/A with type 31	V_Phi2[4]
4555	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Vn. – N/A in 400Hz systems – N/A with type 31	V_Phi2[5]
4556	6	R	x10	Deg	INT	0..3600		H	same as above harmonic 4	V_Phi4[..]
4562	6	R	x10	Deg	INT	0..3600		H	same as above harmonic 6	V_Phi6[..]
4568	6	R	x10	Deg	INT	0..3600		H	same as above harmonic 8	V_Phi8[..]
4640	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Ia. – N/A in 400Hz systems	I_Phi2[0]
4641	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Ib. – N/A in 400Hz systems	I_Phi2[1]
4642	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of Ic. – N/A in 400Hz systems	I_Phi2[2]
4643	1	R	x10	Deg	INT	0..3600		H	Phase of harmonic 2 of In. – N/A in 400Hz systems – N/A with type 31	I_Phi2[3]
4644	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 4	I_Phi4[..]
4648	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 6	I_Phi6[..]
4652	4	R	x10	Deg	INT	0..3600		H	same as above harmonic 8	I_Phi8[..]

Analog Pre-defined Alarms

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
5700	1	R	-	-	Bitmap	0.0xFFFF		H	Pre-Defined Alarms Status Bitmap. Alarms 48 through 63. Bit 0 represents status of Pre-Defined. Alarm N°48. If set, Alarm is active. Status tracks the actual alarm status.	pDefAlStatus[0]
5701	1	R	-	-	Bitmap	0.0xFFFF		H	Pre-Defined Alarms Status Bitmap. Alarms 32 through 47. Bit 0 represents status of Pre-Defined Alarm N°32. If set, Alarm is active. Status tracks the actual alarm status.	pDefAlStatus[1]
5702	1	R	-	-	Bitmap	0.0xFFFF		H	Pre-Defined Alarms Status Bitmap. Alarms 16 through 31. Bit 0 represents status of Pre-Defined Alarm N°16. If set, Alarm is active. Status tracks the actual alarm status.	pDefAlStatus[2]
5703	1	R	-	-	Bitmap	0.0xFFFF		H	Pre-Defined Alarms Status Bitmap. Alarms 0 through 15. Bit 0 represents status of Pre-Defined Alarm N°1. If set, Alarm is active. Status tracks the actual alarm status.	pDefAlStatus[3]
6000	12				**Template**				Pre-Defined Alarm N° **1** Setting. **Over Current Phase A**	nv_pDefAlCfg[0]
6000	1	R/W*	-	-	INT	see text		H	MSB: 0=ON, 1=OFF, LSB: Priority set to 0, 1, 2 or 3. When set to 0, MM will not log event into MM event log (file N°10) and MM will not log event into MM Wave Form capture (file N°5). Default value: 0x0101	___.Status
6001	1	Read only	-	-	INT	1016		H	Register number which content gets compared to the pickup setpoint and to the dropout setpoint. Default value: 1016	___.CompReg
6002	1	Read only	-	-	INT	1		H	Comparison mode. MSB indicates Pickup mode. LSB indicates Dropout mode. MSB can be set to 1, 2 or 4. LSB can be set to 1, 2 or 4. - 1 selects Immediate mode: register PuValue contains the numerical value to which the monitored register is compared. No percentage is applied. .Default value is 0x0101	___.Mode
6003	1	R/W*	see text	see text	INT			H	Alarm Actuation set point. When Immediate mode is selected, care must be taken to set this register with the same units and scale factors then the Compare Register CompReg. Default value: 0x8000.	___.PuValue

Analog Pre-defined Alarms

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
6004	1	Read only	100	%	INT			H	This register contains a numerical value that is multiplied to the content of the pickup register, when Direct Mode is selected. Otherwise, register is not used. Default value: 0x8000.	___.PuPercentage
6005	1	R/W*	x1	s	INT			H	Actuation time delay Time delay must be set in seconds. Default value: 0x8000.	___.StatusPuDelay
6006	1	R/W*	see text	see text	INT			H	Release set point When Immediate mode is selected, care must be taken to set this register with the same units and scale factors then the Compare Register CompReg. Default value: 0x8000.	___.DoValue
6007	1	Read only	100	%	INT			H	This register contains a numerical value that is multiplied to the content of the dropout register, when Direct Mode is selected. Otherwise, register is not used. Default value: 0x8000.	___.DoPercentage
6008	1	R/W*	x1	s	INT			H	Release time delay. Time delay must be set in seconds. Default value: 0x8000.	___.DoDelay
6009	1	Read only	-	-	INT	{0, 1, 2, 3}		H	Alarm Type. 0 indicates "Over", 1 indicates "Under", 2 indicates "Equal to", 3 indicates "Different from", 5 is used for all other alarms. Default is: 1.	___.AlarmType
6010	1	R/W*	-	-	INT	Bitmap		H	Action associated with overrunning of the set point after the time delay has run out. Log into the Wave Form Capture file (file N° 5). 0x0200➜action activated. Default value is 0x0000.	___.LogAction
6011	1	R/W*	-	-	-			H	Reserved.	___.
6012	12					Template			Pre-Defined Alarm N° **2** Setting. **Over Current Phase B**	nv_pDefAlCfg[1]
6024	12					Template			Pre-Defined Alarm N° **3** Setting. **Over Current Phase C**	nv_pDefAlCfg[2]
6036	12					Template			Pre-Defined Alarm N° **4** Setting. **Over Neutral Current**	nv_pDefAlCfg[3]
6048	12					Template			Pre-Defined Alarm N° **5** Setting. **Over Ground Current**	nv_pDefAlCfg[4]
6060	12					Template			Pre-Defined Alarm N° **6** Setting. **Under Current Phase A**	nv_pDefAlCfg[5]
6072	12					Template			Pre-Defined Alarm N° **7** Setting. **Under Current Phase B**	nv_pDefAlCfg[6]
6084	12					Template			Pre-Defined Alarm N° **8** Setting. **Under Current Phase C**	nv_pDefAlCfg[7]

Analog Pre-defined Alarms

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
6096	12					Template			Pre-Defined Alarm N° **9** Setting. **Over Current Unbalance Phase A**	nv_pDefAlCfg[8]
6108	12					Template			Pre-Defined Alarm N° **10** Setting. **Over Current Unbalance Phase B**	nv_pDefAlCfg[9]
6120	12					Template			Pre-Defined Alarm N° **11** Setting. **Over Current Unbalance Phase C**	nv_pDefAlCfg[10]
6132	12					Template			Pre-Defined Alarm N° **12** Setting. **Over Voltage Phase A**	nv_pDefAlCfg[11]
6144	12					Template			Pre-Defined Alarm N° **13** Setting. **Over Voltage Phase B**	nv_pDefAlCfg[12]
6156	12					Template			Pre-Defined Alarm N° **14** Setting. **Over Voltage Phase C**	nv_pDefAlCfg[13]
6168	12					Template			Pre-Defined Alarm N° **15** Setting. **Under Voltage Phase A**	nv_pDefAlCfg[14]
6180	12					Template			Pre-Defined Alarm N° **16** Setting. **Under Voltage Phase B**	nv_pDefAlCfg[15]
6192	12					Template			Pre-Defined Alarm N° **17** Setting. **Under Voltage Phase C**	nv_pDefAlCfg[16]
6204	12					Template			Pre-Defined Alarm N° **18** Setting. **Over Voltage Unbalance Phase A**	nv_pDefAlCfg[17]
6216	12					Template			Pre-Defined Alarm N° **19** Setting. **Over Voltage Unbalance Phase B**	nv_pDefAlCfg[18]
6228	12					Template			Pre-Defined Alarm N° **20** Setting. **Over Voltage Unbalance Phase C**	nv_pDefAlCfg[19]
6240	12					Template			Pre-Defined Alarm N° **21** Setting. **Over kVA 3-ph Total**	nv_pDefAlCfg[20]
6252	12					Template			Pre-Defined Alarm N° **22** Setting. **Over kW Into The Load 3-ph Total**	nv_pDefAlCfg[21]
6264	12					Template			Pre-Defined Alarm N° **23** Setting. **Over kW Out Of The Load 3-ph Total**	nv_pDefAlCfg[22]
6276	12					Template			Pre-Defined Alarm N° **24** Setting. **Over kVAR Into The Load 3-ph Total**	nv_pDefAlCfg[23]
6288	12					Template			Pre-Defined Alarm N° **25** Setting. **Over kVAR Out of The Load 3-ph Total**	nv_pDefAlCfg[24]
6300	12					Template			Pre-Defined Alarm N° **26** Setting. **Under kVA 3-ph Total**	nv_pDefAlCfg[25]
6312	12					Template			Pre-Defined Alarm N° **27** Setting. **Under kW Into The Load 3-ph Total**	nv_pDefAlCfg[26]
6324	12					Template			Pre-Defined Alarm N° **28** Setting. **Under kW Out Of The Load 3-ph Total**	nv_pDefAlCfg[27]
6336	12					Template			Pre-Defined Alarm N° **29** Setting. **Under kVAR Into The Load 3-ph Total**	nv_pDefAlCfg[28]
6348	12					Template			Pre-Defined Alarm N° **30** Setting. **Under kVAR Into The Load 3-ph Total**	nv_pDefAlCfg[29]
6360	12					Template			Pre-Defined Alarm N° **31** Setting. **Lagging True Power Factor 3-ph Total**	nv_pDefAlCfg[30]

Analog Pre-defined Alarms

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
6372	12					Template			Pre-Defined Alarm N° **32** Setting. **Leading True Power Factor 3-ph Total**	nv_pDefAlCfg[31]
6384	12					Template			Pre-Defined Alarm N° **33** Setting. **Lagging Displacement Power Factor 3-ph Total**	nv_pDefAlCfg[32]
6396	12					Template			Pre-Defined Alarm N° **34** Setting. **Leading Displacement Power Factor 3-ph Total**	nv_pDefAlCfg[33]
6408	12					Template			Pre-Defined Alarm N° **35** Setting. **Over Value THD Current Phase A**	nv_pDefAlCfg[34]
6420	12					Template			Pre-Defined Alarm N° **36** Setting. **Over Value THD Current Phase B**	nv_pDefAlCfg[35]
6432	12					Template			Pre-Defined Alarm N° **37** Setting. **Over Value THD Current Phase C**	nv_pDefAlCfg[36]
6444	12					Template			Pre-Defined Alarm N° **38** Setting. **Over Value THD Voltage Phase A**	nv_pDefAlCfg[37]
6456	12					Template			Pre-Defined Alarm N° **39** Setting. **Over Value THD Voltage Phase B**	nv_pDefAlCfg[38]
6468	12					Template			Pre-Defined Alarm N° **40** Setting. **Over Value THD Voltage Phase C**	nv_pDefAlCfg[39]
6480	12					Template			Pre-Defined Alarm N° **41** Setting. **Over Value THD Voltage L2L A-B**	nv_pDefAlCfg[40]
6492	12					Template			Pre-Defined Alarm N° **42** Setting. **Over Value THD Voltage L2L B-C**	nv_pDefAlCfg[41]
6504	12					Template			Pre-Defined Alarm N° **43** Setting. **Over Value THD Voltage L2L C-A**	nv_pDefAlCfg[42]
6516	12					Template			Pre-Defined Alarm N° **44** Setting. **Over Predicted kVA Demand**	nv_pDefAlCfg[43]
6528	12					Template			Pre-Defined Alarm N° **45** Setting. **Over Predicted kW Demand Into The Load 3-ph Total**	nv_pDefAlCfg[44]
6540	12					Template			Pre-Defined Alarm N° **46** Setting. **Over Predicted kW Demand Out Of The Load 3-ph Total**	nv_pDefAlCfg[45]
6552	12					Template			Pre-Defined Alarm N° **47** Setting. **Over Predicted kVAR Demand Into The Load 3-ph Total**	nv_pDefAlCfg[46]
6564	12					Template			Pre-Defined Alarm N° **48** Setting. **Over Predicted kVAR Demand Out Of The Load 3-ph Total**	nv_pDefAlCfg[47]
6576	12					Template			Pre-Defined Alarm N° **49** Setting. **Under Predicted kVA Demand**	nv_pDefAlCfg[48]
6588	12					Template			Pre-Defined Alarm N° **50** Setting. **Under Predicted kW Demand Into The Load 3-ph Total**	nv_pDefAlCfg[49]
6600	12					Template			Pre-Defined Alarm N° **51** Setting. **Under Predicted kW Demand Out Of The Load 3-ph Total**	nv_pDefAlCfg[50]
6612	12					Template			Pre-Defined Alarm N° **52** Setting. **Under Predicted kVAR Demand Into The Load 3-ph Total**	nv_pDefAlCfg[51]
6624	12					Template			Pre-Defined Alarm N° **53** Setting. **Under Predicted kVAR Demand Out Of The Load 3-ph Total**	nv_pDefAlCfg[52]

Wave Form Capture

Registers 7132 to 7157 file N° 5   (see the section : Access to the files)

Event log

Registers 7164 to 7188 file N° 10 (see the section : Access to the files)

Min-Max Event log

Registers 7196 to 7220 file N° 11 (see the section : Access to the files)

Maintenance Event log

Registers 7228 to 7252 file N° 12 (see the section : Access to the files)

Table of registers
Protection manager @ xx + 100

Characteristics of the protection manager

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	Description	label
8700	4	R	1	-	Ascii	-	A/E	P/H	Serial number encoded in Adcii	EeSerialNumber
8710	1	R	1	-	INT	-	A/E	P/H	Protection module firmware version	EeFWVersion
8716	1	R	1	-	INT		A/E	P/H	Square D Identification number 15131 = Micrologic A (PM) 15133 = Micrologic P (PM) 15135 = Micrologic H (PM) Default value = 0x8000	EeSQD_Prod_ID
8740	1	R	1	-	Ascii	20,30,40 50,60,70	A/E	P/H	Type of protection 20 = Micrologic 2.0,… 70 = Micrologic 7.0	EeUnitModelNum
8741	1	R	1	-	Ascii	A,E,P,H	A/E	P/H	Type of measurement : A, E, P or H Or Type of application : M	EeUnitType
8742	1	R	1	-	INT	0..15	A/E	P/H	Type of long time rating plug 0 = missing, 1= IEC standard; 2 = IEC low ; 3 = IEC High ; 10 = OFF ; 7 = UL-A ; 8 = UL-B ; 9 = UL-C ; 11= UL-D ; 12 = UL-E ; 13 = UL-F ; 14 = UL-G ; 15 = UL-H	HwLT_PlugType
8750	1	R	x1	A	INT	0..8000	A/E	P/H	rated circuit-breaker current Default value: 100 A (circuit-breaker sensor plug not present)	HwBrNominalCurrent
8753	1	R/W	x1	notch	INT	0..3	A/E	P/H	type of neutral protection **b** 0: OFF **b** 1: N/2 (Ir/2) **b** 2: N (Ir) **b** 3: Nx1.6 (1.6 Ir)	EeNeutralProtType

Basic protections settings

b long-time protection   Alarm N° 1000   **lr**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	Description	label
8754	1	R	-	-	INT	0x0001	A/E	P/H	**b** 0x0001 (protection active)	LongTime_Status
8755	1	R/W	-	-	INT	Bitmap 16	A/E	P/H	type of Idmtl curve **b** bit 0: standard long-time curve I²t (default value) **b** bit 1: SIT curve **b** bit 2: VIT curve **b** bit 3: EIT (#I²t on) curve **b** bit 4: HVF curve **b** bit 5: constant time (#I²t off)	LongTime_Config
8756	2	R/W	x1	A	MOD 10000	40..8000	A/E	P/H	Ir pickup for the long-time protection	LongTime_PuValue
8758	1	R/W	x1	ms	INT	500. 24000	A/E	P/H	tr tripping delay for the long-time protection	LongTime_PuDelay
8762	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	LongTime_LogAction
8763	1	R/W	-	-	INT	Bitmap 16		P/H	list of "pickup" actions linked to overrun of set point at the end of the delay Bit set to 1: action activated **b** bit 0: always set to 1 (trip action) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0001 – (trip action)	LongTime_ActuAction

							b short-time protection	Alarm N° 1001	**Isd**	
register	nbr of registers	read/ write	scal e	unit	format	Interval	A/E	P/H	description	label
8764	1	R	-	-	INT	0x0001	A/E	P/H	**b** 0x0001 (protection active)	ShortTime_Status
8765	1	R/W	-	-	INT	0, 1	A/E	P/H	type de protection **b** 0: type i²ton **b** 1: type i²toff	ShortTime_Config
8766	2	R/W	x1	A	MOD 10000	60.. 80 000	A/E	P/H	Isd pickup for the short-time protection	ShortTime_PuValue
8768	1	R/W	x1	ms	INT	0..400	A/E	P/H	tsd tripping delay for the short-time protection 0 s valid only for the I²t off position 100 to 400 ms: valid for the I²t on and I²t off positions	ShortTime_PuDelay
8772	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	ShortTime_LogAction
8773	1	R/W	-	-	INT	Bitmap 16		P/H	list of "pickup" actions linked to overrun of set point at the end of the delay Bit set to 1: action activated **b** bit 0: always set to 1 (trip action) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0001 – (trip action)	ShortTime_ActuAction

Table of registers
Protection manager @ xx + 100

	b instantaneous protection	Alarm N°1002	**li**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
8774	1	R	-	-	INT	0x0001 0x0101	A/E	P/H	**b** 0x0001 (protection active) **b** 0x0101 (protection OFF) Default value = 0x0001	Instant_Status
8775	1	R/W	-	-	INT	-		P/H	reserved	Instant_Config
8776	2	R/W	x1	A	MOD 10000	200.. 120 000	A/E	P/H	I pickup for the instantaneous protection	Instant_PuValue
8778	1	R/W	-	-	-	-			reserved	Instant_PuDelay
8782	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Instant_LogAction
8783	1	R/W	-	-	INT	Bitmap 16		P/H	list of "pickup" actions linked to overrun of set point at the end of the delay Bit set to 1: action activated **b** bit 0: always set to 1 (trip action) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0001 – (trip action)	Instant_ActuAction

Table of registers
Protection manager @ xx + 100

b ground-fault protection   Alarm N°1003   **Ig**

register	nbr of registers	read/write [1]	scale	unit	format	interval	A/E	P/H	description	label
8784	1	R/W [1]	-	-	INT	0x0001 0x0101	A/E	P/H	**b** 0x0001 (protection active) **b** 0x0101 (protection OFF) Default value = 0x0001	Res_Status
8785	1	R/W	-	-	INT	0, 1	A/E	P/H	type de protection **b** 0: I²t on **b** 1: I²t off	Res_Config
8786	2	R/W	x1	A	MOD 10000	30..1200	A/E	P/H	Ig pickup for the ground-fault protection	Res_PuValue
8788	1	R/W	x1	ms	INT	0..400	A/E	P/H	tg tripping delay for the ground-fault protection **b** 0 s valid only for the I²t off position **b** 100 to 400 ms: valid for the I²t on and I²t off positions	Res_PuDelay
8792	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Res_LogAction
8793	1	R/W	-	-	INT	Bitmap 16		P/H	list of "pickup" actions linked to overrun of set point at the end of the delay Bit set to 1: action activated **b** bit 0: always set to 1 (trip action) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0001 – (trip action)	Res_ActuAction

(1) In order to be able to write this register, the following conditions must be met : Micrologic 6 P or 6 H
Firmware revision 8.243 or above (see register 8710)
Activation of the option Ground Fauilt Inhibit through the utility   enable_GFI (available on req

Table of registers
Protection manager @ xx + 100

					b	earth-leakage protection				Alarm N°1004	**Idelta n**

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
8794	1	R	-	-	INT	0x0001	A/E	P/H	**b** 0x0001 (protection active)	Vigi_Status
8795	1	R/W	-	-	INT	-	A/E	P/H	reserved	Vigi_Config
8796	2	R/W	x1	mA	MOD 10000	5..300	A/E	P/H	IΔN pickup for the earth-leakage protection	Vigi_PuValue
8798	1	R/W	x1	ms	INT	0..1000	A/E	P/H	Δt tripping delay for the earth-leakage protection	Vigi_PuDelay
8802	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Vigi_LogAction
8803	1	R/W	-	-	INT	Bitmap 16		P/H	list of "pickup" actions linked to overrun of set point at the end of the delay Bit set to 1: action activated **b** bit 0: always set to 1 (trip action) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0001 – (trip action)	Vigi_ActuAction
8804	1	R	-	-	UINT	0.0xFFFF		P/H	PM configuration change counter. This counter is incremented each time a PM setting change is applied through HMI (keyboard or switches) or COM . If switches were change during power off, this counter is incremented at power up	EePMCfgChangeCntr

Protection manager measurements

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
8833	1	R	x10	% In	INT	0..16000		P/H	maximum fault current (trip) recorded on pole 1 since last reset [10] Default value: 0x8000 (no fault recorded or circuit-breaker type not entered)	eeMaxFaultI[0]
8834	1	R	x10	% In	INT	0..16000		P/H	maximum fault current (trip) recorded on pole 2 since last reset [10] Default value: 0x8000 (no fault recorded or circuit-breaker type not entered)	eeMaxFaultI[1]
8835	1	R	x10	% In	INT	0..16000		P/H	maximum fault current (trip) recorded on pole 3 since last reset [10] Default value: 0x8000 (no fault recorded or circuit-breaker type not entered)	eeMaxFaultI[2]
8836	1	R	x10	% In	INT	0..16000		P/H	maximum fault current (trip) recorded on the neutral pole since last reset [10] Default value: 0x8000 (no fault recorded or circuit-breaker code not supplied)	eeMaxFaultI[3]
8837	1	R	x1	% Ir	INT	0..32767	A/E	P/H	rms current on phase 1 expressed as a % of the Ir long-time set point	I_RMSRelIr[0]
8838	1	R	x1	% Ir	INT	0..32767	A/E	P/H	rms current on phase 2 expressed as a % of the Ir long-time set point	I_RMSRelIr[1]
8839	1	R	x1	% Ir	INT	0..32767	A/E	P/H	rms current on phase 3 expressed as a % of the Ir long-time set point	I_RMSRelIr[2]
8840	1	R	x1	% Ir	INT	0..32767	A/E	P/H	rms current on the neutral expressed as a % of the rated current In x the selected neutral setting (x 1, x 2 or x 0.5). [2]	I_RMSRelIr[3]
8841	1	R	x1	% Ig	INT	0..32767	A/E	P/H	"Residual" ground-fault current expressed as a % of the Ig ground-fault protection set point [3]	I_RMSGndRelIr
8842	1	R	x0.01	% Idn	INT	0..32767	A/E	P/H	Earth-leakage current expressed as a % of the IΔN earth-leakage protection set point [4]	I_RMSVigiRelIr

[2] Value not accessible when configuration register 9618 selects "no external CT".
[3] Accessible only with Micrologic 6.0.
[4] Accessible only with Micrologic 7.0.
[10] Auxiliary power is required to calculate the fault currents. Calculation is effective only when the circuit-breaker selection code has been supplied (see the Micrologic user manual).

Status of the protection manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
8843	1	R	x1	%	INT	0..100	A/E	P/H	battery-charge indicator U>2800mV : 100% 2200<U<2800mV : 50% U<2200mV : 0%	BatteryIndic
8857	1	R	-	-	INT	Bitmap 16		P/H	status word for the contacts on the M2C or M6C module **b** bit set to 1: contact latched **b** bit set to 0: contact unlatched Reset not possible. Automatic update. **b** bit 0: contact 1 on an M2C or M6C module **b** bit 1: contact 2 on an M2C or M6C module **b** bit 2: contact 3 on an M6C module **b** bit 3: contact 4 on an M6C module **b** bit 4: contact 5 on an M6C module **b** bit 5: contact 6 on an M6C module	RlyStatus
8862	1	R	-	-	INT	Bitmap 16		P/H	status word for overrun of current-protection set points. This condition is reached as soon as the protection set point is overrun, even if the time delay has not expired. **b** bit 0: long-time and LT IDMTL protection If the bit is set to: **b** 0: set-point overrun = False **b** 1: set-point overrun = True	BasProtPickupStatus
8863	1	R	-	-	INT	Bitmap 16		P/H	status word for overrun of protection set points **b** bit 0: current unbalance **b** bit 1: maximum current on phase 1 **b** bit 2: maximum current on phase 2 **b** bit 3: maximum current on phase 3 **b** bit 4: maximum current on the neutral **b** bit 5: minimum voltage **b** bit 6: maximum voltage **b** bit 7: voltage unbalance **b** bit 8: maximum power **b** bit 9: reverse power **b** bit 10: minimum frequency **b** bit 11: maximum frequency **b** bit 12: phase rotation **b** bit 13: load shedding based on current **b** bit 14: load shedding based on power	AdvProtPickupStatus
8864					INT	Bitmap 16			continuation of status word for overrun of advanced protection set points **b** bit 0: ground-fault alarm **b** bit 1: earth-leakage alarm	AdvXtedProtTripStatus
8865	2	R	x0.1	s	MOD 10000	-		P/H	time remaining before long-time tripping	TimeLeftUntilLT_Trip
8872	1	R				0…1			Phase rotation 0 = abc ; 1 = acb	Rotatephase

Time stamping and trip/alarm history

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9000	4	R	-	-	XDATE	-		P/H	current date of the protection manager	XtedDateTime
9010	3	R	-	-	DATE	-		P/H	date of last reset of the maximum phase, ground-fault and earth-leakage currents	NvLastMaxI_Reset
9070	3	R	-	-	DATE	-		P/H	date of last reset of the trip history (last ten faults)	NvLast10TripReset
9073	3	R	-	-	DATE	-		P/H	date of last reset of the alarm history (last ten alarms)	NvLast10AlarmReset

b trip history

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9094	4	R	1	%	INT	0..32767		P/H	Contact wear indicator per phase. Default value = 0x8000. The contacts must be inspected each time the counter reaches a hundred mark. The message "Not available or circuit-breaker type not defined" is displayed if the type of the circuit-breaker has not been defined. In this case, see "Breaker selection" in the Micrologic set-up menu.See register 9846	PhaseContactWear
9098	1	R	-	-	INT	0..10		P/H	number of faults recorded in the trip history (FIFO)	NvTotalTripQ_Entries
9099	1	R	-	-	INT	0..9		P/H	value of the pointer for the last fault recorded in the trip history. The last fault recorded is in nvLastTripQ_Entry. The next to last fault is in nvLastTripQ_Entry-1 modulo 10.	NvLastTripQ_Entry
9100	20	R	-	-	TRIP RECORD	-		P/H	record 0 in the FIFO	TripRecord[0]
9120	20	R	-	-	TRIP RECORD	-		P/H	record 1 in the FIFO	TripRecord[1]
9140	20	R	-	-	TRIP RECORD	-		P/H	record 2 in the FIFO	TripRecord[2]
9160	20	R	-	-	TRIP RECORD	-		P/H	record 3 in the FIFO	TripRecord[3]
9180	20	R	-	-	TRIP RECORD	-		P/H	record 4 in the FIFO	TripRecord[4]
9200	20	R	-	-	TRIP RECORD	-		P/H	record 5 in the FIFO	TripRecord[5]
9220	20	R	-	-	TRIP RECORD	-		P/H	record 6 in the FIFO	TripRecord[6]
9240	20	R	-	-	TRIP RECORD	-		P/H	record 7 in the FIFO	TripRecord[7]
9260	20	R	-	-	TRIP RECORD	-		P/H	record 8 in the FIFO	TripRecord[8]
9280	20	R	-	-	TRIP RECORD	-		P/H	record 9 in the FIFO	TripRecord[9]

b alarm history

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9300	1	R	-	-	INT	0..10		P/H	number of alarms recorded in the alarm history (FIFO)	NvTotalAlarmQ_Entries
9301	1	R	-	-	INT	0..9		P/H	value of the pointer for the last alarm recorded in the alarm history. The last alarm recorded is in nvLastAlarmQ_Entry. The next to last alarm is in nvLastAlarmQ_Entry-1 modulo 10.	NvLastAlarmQ_Entry
9302	15	R	-	-	ALARM RECORD	-		P/H	record 0 in the FIFO	AlarmRecord[0]
9317	15	R	-	-	ALARM RECORD	-		P/H	record 1 in the FIFO	AlarmRecord[1]
9332	15	R	-	-	ALARM RECORD	-		P/H	record 2 in the FIFO	AlarmRecord [2]
9347	15	R	-	-	ALARM RECORD	-		P/H	record 3 in the FIFO	AlarmRecord [3]
9362	15	R	-	-	ALARM RECORD	-		P/H	record 4 in the FIFO	AlarmRecord [4]
9377	15	R	-	-	ALARM RECORD	-		P/H	record 5 in the FIFO	AlarmRecord [5]
9392	15	R	-	-	ALARM RECORD	-		P/H	record 6 in the FIFO	AlarmRecord [6]
9407	15	R	-	-	ALARM RECORD	-		P/H	record 7 in the FIFO	AlarmRecord [7]
9422	15	R	-	-	ALARM RECORD	-		P/H	record 8 in the FIFO	AlarmRecord [8]
9437	15	R	-	-	ALARM RECORD	-		P/H	record 9 in the FIFO	AlarmRecord [9]

For further details see section *Appendix :* Trip/alarm history

Configuration of the protection manager

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9600	1	R	-	-	INT	0..32767		P/H	Control word for the protection manager. This control word may not be user set. It is randomly modified and must be read before sending certain commands to the protection manager.	Control word
9604	2	R/W	-	-	ASCII	0x00.. 0x7F		P/H	short identifier of the protection manager, coded over four ASCII characters. Default value: "set!"	eeBrLabel
9606	8	R/W	-	-	ASCII	0x00.. 0x7F		P/H	long identifier of the protection manager, coded over 16 ASCII characters. Default value: "please set me up"	eeBrNamePlate
9614	1	R/W	-	-	INT	Bitmap 16		P/H	language used by the control unit May be modified via the control-unit keypad. Default value: "english" (but may be factory set if necessary). **b** bit 0: French **b** bit 1: US English **b** bit 2: UK English **b** bit 3: German **b** bit 4: Spanish **b** bit 5: Italian **b** bit 6: optional language available on order from Schneider Electric	eeUnitLanguage
9615	1	R/W	-	-	INT	Bitmap 16			rated circuit-breaker operating frequency required by the protection manager to disable phase-rotation protection for 400 Hz distribution system. Default value: 50 / 60 Hz, other possible value: 400 Hz. **b** bit 0: 50 / 60 Hz **b** bit 3: 400 Hz	eEeNominalFreq
9616	1	R/W	x1	V	INT	100..1150		P/H	rated primary voltage on the voltage transformer Default value: 690 V	eePT_RatioPri
9617	1	R/W	x1	V	INT	100..1150		P/H	rated secondary voltage on the voltage transformer Default value: 690 V	eePT_RatioSec
9618	1	R/W	-	-	INT	{0,1, 2}		P/H	**b** 0: 3-Pole circuit breaker without External Neutral Current Transformer **b** 1: 4-Pole circuit breaker **b** 2: 3-Pole circuit breaker with External Neutral Current Transformer Default value: 0	eeNeutralCTType

Advanced protection settings

The concerned protection functions are the listed below.
ground-fault or earth-leakage alarm
current unbalance I unbal
maximum current I1 max, I2 max, I3 max and IN max
minimum and maximum voltage U min and U max
voltage unbalance U unbal
reverse power rP max
minimum and maximum frequency F min and F max
phase rotation
load shedding and reconnection based on current and power.

b ground-fault alarm   Alarm N°1014 [*]

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	label
9629	1	R/W	-	-	INT	0x0001 0x0101		P/H	0x0001 (alarm active) 0x0101 (OFF) Default value: 0x0101	AlarmTerreRes_Status
9631	2	R/W*	x1	A	MOD 10000	20..1200		P/H	pickup for the ground-fault protection alarm minimum limited to 5% of In Default value: 1200 A	AlarmTerreRes_PuValue
9633	1	R/W*	x0.1	Sec	INT	10..100		P/H	pickup delay for the ground-fault protection alarm Default value: 100 (10 s)	AlarmTerreRes_PuDelay
9634	2	R/W*	x1	A	MOD 10000	20..1200		P/H	dropout for the ground-fault protection alarm maximum limited to AlarmTerreRes_PuValue minimum limited to 5% of In, default value: 1200 A	AlarmTerreRes_DoValue
9636	1	R/W*	x0.1	Sec	INT	10..100		P/H	dropout delay for the ground-fault protection alarm Default value: 10 (1s)	AlarmTerreRes_DoDelay
9637	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	AlarmTerreRes_LogAction
9638	1	R/W*	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** bit 0: always set to 0 (trip disabled for this type of alarm) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	AlarmTerreRes_Actu Action

(1)   Accessible only with Micrologic 5.0 P, 6.0 P, 5.0 H, 6.0 H

b earth-leakage alarm [(*)]   Alarm N°1015

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9639	1	R/W*	-	-	INT	0x0001 0x0101		P/H	0x0001 (alarm active) 0x0101 (OFF) Default value: 0x0101	AlarmTerreVigi_Status
9641	2	R/W*	x0.1	A	MOD 10000	5..300		P/H	pickup for the earth-leakage protection alarm Default value: 300 (30 A)	AlarmTerreVigi_PuValue
9643	1	R/W*	x0.1	Sec	INT	10..100		P/H	pickup delay for the earth-leakage protection alarm Default value: 100 (10 s)	AlarmTerreVigi_PuDelay
9644	2	R/W*	x0.1	A	MOD 10000	5..300		P/H	dropout for the earth-leakage protection alarm maximum limited to AlarmTerreVigi_PuValue Default value: 300 (30 A)	AlarmTerreVigi_DoValue
9646	1	R/W*	x0.1	Sec	INT	10..100		P/H	dropout delay for the earth-leakage protection alarm Default value: 10 (1 s)	AlarmTerreVigi_DoDelay
9647	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	AlarmTerreVigi_LogActio n
9648	1	R/W*	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** bit 0: always set to 0 (trip disabled for this type of alarm) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	AlarmTerreVigi_Actu Action

(1) Accessible only with Micrologic 7.0P, 7.0 H

								b current unbalance	Alam N°1016	I unbal protection

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	Description	label
9649	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	Unball_Status
9651	2	R/W	x1	%	MOD 10000	5..60		P/H	pickup for the current unbalance on phase 1 Default value: 60%	Unball_PuValue
9653	1	R/W	x0.1	s	INT	10..400		P/H	pickup delay for the current unbalance on phase 1 Default value: 400 (40 s)	Unball_PuDelay
9654	2	R/W	x1	%	MOD 10000	5..60		P/H	dropout for the current unbalance on phase 1 Default value: 60%	Unball_DoValue
9656	1	R/W	x0.1	s	INT	100..3600		P/H	dropout delay for the current unbalance on phase 1 Default value: 10 (1 s)	Unball_DoDelay
9657	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Unball_LogAction
9658	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit-breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	Unball_ActuAction

						b maximum current			Alarm N°1017	I1 max protection

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9659	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	Overl1_Status
9661	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	pickup for the maximum current I1 max **b** maximum limited to 1 x hwNominalCurrent **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent	Overl1_PuValue
9663	1	R/W	x1	s	INT	15.. 1500		P/H	pickup delay for the maximum current I1 max Default value: 1500 s	Overl1_PuDelay
9664	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	dropout for the maximum current I1 max **b** maximum limited to Overla_PuValue **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent	Overl1_DoValue
9666	1	R/W	x1	s	INT	15.. 3000		P/H	dropout delay for the maximum current I1 max Default value: 15 s	Overl1_DoDelay
9667	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Overl1_LogAction
9668	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to1, the circuit-breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	Overl1_ActuAction

						b maximum current		Alarm N°1018	I2 max protection	
register	nbr of registers	read/ write	scal e	unit	format	interval	A/E	P/H	description	label
9669	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	OverI2_Status
9671	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	pickup for the maximum current I2 max **b** maximum limited to 1 x hwNominalCurrent **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent	OverI2_PuValue
9673	1	R/W	x1	s	INT	15.. 1500		P/H	pickup delay for the maximum current I2 max Default value: 1500 s	OverI2_PuDelay
9674	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	dropout for the maximum current I2 max **b** maximum limited to OverIb_PuValue **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent	OverI2_DoValue
9676	1	R/W	x1	s	INT	15.. 3000		P/H	dropout delay for the maximum current I2 max Default value: 15 s	OverI2_DoDelay
9677	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	OverI2_LogAction
9678	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to1, the circuit-breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	OverI2_ActuAction

						b maximum current		Alarm N°1019	I3 max protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9679	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	OverI3_Status
9682	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	pickup for the maximum current I3 max **b** maximum limited to 1 x hwNominalCurrent **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent.	OverI3_PuValue
9683	1	R/W	x1	s	INT	15.. 1500		P/H	pickup delay for the maximum current I3 max Default value: 1500 s	OverI3_PuDelay
9685	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	dropout for the maximum current I3 max **b** maximum limited to OverIc_PuValue **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent	OverI3_DoValue
9686	1	R/W	x1	s	INT	15.. 3000		P/H	dropout delay for the maximum current I3 max Default value: 15 s	OverI3_DoDelay
9687	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	OverI3_LogAction
9688	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to1, the circuit-breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	OverI3_ActuAction

						b maximum current		Alarm N°1020	IN max protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9689	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	OverIn_Status
9692	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	pickup for the maximum current IN max **b** maximum limited to 1 x hwNominalCurrent **b** minimum limited to 0.2 x hwNominalCurrent **b** default value: 1 x hwNominalCurrent.	OverIn_PuValue
9693	1	R/W	x1	s	INT	15.. 1500		P/H	pickup delay for the maximum current IN max Default value: 1500 s	OverIn_PuDelay
9695	2	R/W	x1	A	MOD 10000	20.. 80000		P/H	dropout for the maximum current IN max **b** maximum limited to OverIn_PuValue **b** minimum limited to 0.2 x hwNominalCurrent **b** Default value: 1 x hwNominalCurrent	OverIn_DoValue
9696	1	R/W	x1	s	INT	15.. 3000		P/H	dropout delay for the maximum current IN max Default value: 15 s	OverIn_DoDelay
9697	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	OverIn_LogAction
9698	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	OverIn_ActuAction

Table of registers
Protection manager @ xx + 100

							b minimum voltage		Alarm N°1021	U min protection

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9699	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	UnderV_Status
9701	2	R/W	x1	V	MOD 10000	100.. 1200		P/H	pickup for the minimum voltage U min **b** maximum limited to OverV.PuValue **b** default value: 100 V	UnderV_PuValue
9703	1	R/W	x0.01	s	INT	20..500		P/H	pickup delay for the minimum voltage U min Default value: 500 (5 s)	UnderV_PuDelay
9704	2	R/W	x1	V	MOD 10000	100.. 1200		P/H	dropout for the minimum voltage U min **b** minimum limited to UnderV_PuValue **b** default value: 100 V	UnderV_DoValue
9706	1	R/W	x0.01	s	INT	20.. 3600		P/H	dropout delay for the minimum voltage U min Default value: 20 (0.02 s)	UnderV_DoDelay
9707	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	UnderV_LogAction
9708	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	UnderV_ActuAction

						b maximum voltage		Alarm N°1022		U max protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9709	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	OverV_Status
9711	2	R/W	x1	V	MOD 10000	100.. 1200		P/H	pickup for the maximum voltage U max **b** minimum limited to the pickup value **b** default value: +5% above eePT_RatioPri (primary voltage on the voltage transformer)	OverV_PuValue
9713	1	R/W	x0.01	s	INT	20..500		P/H	pickup delay for the maximum voltage U max Default value: 500 (5 s)	OverV_PuDelay
9714	2	R/W	x1	V	MOD 10000	100.. 1200		P/H	dropout for the maximum voltage U max **b** maximum limited to OverV_PuValue **b** default value: +5 % above de eePT_RatioPri (primary voltage on the voltage transformer).	OverV_DoValue
9716	1	R/W	x0.01	s	INT	20.. 3600		P/H	dropout delay for the maximum voltage U max Default value: 20 (0.02 s)	OverV_DoDelay
9717	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	OverV_LogAction
9718	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	OverV_ActuAction

								b voltage unbalance Alarm N°1023		U unbal protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9719	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	UnbalV_Status
9721	2	R/W	x1	%	MOD 10000	2..30		P/H	pickup for the voltage unbalance U unbal Default value: 30%	UnbalV_PuValue
9723	1	R/W	x0.1	s	INT	10..400		P/H	pickup delay for the voltage unbalance U unbal Default value: 400 (40 s)	UnbalV_PuDelay
9724	2	R/W	x1	%	MOD 10000	2..30		P/H	dropout for the voltage unbalance U unbal **b** maximum limited to UnbalV_PuValue **b** default value: 30%	UnbalV_DoValue
9726	1	R/W	x0.1	s	INT	100.. 3600		P/H	dropout delay for the voltage unbalance U unbal Default value: 100 (10 s)	UnbalV_DoDelay
9727	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	UnbalV_LogAction
9728	1	R/W	-	-	INT	Bitmap 16			actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	UnbalV_ActuAction

						b reverse power		Alarm N°1025		rP max protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9739	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF)	RevPwr_Status
									Default value: 0x0101	
9740	1	R/W*	-	-	INT	-		P/H	direction of active-power flow	RevPwr_Config
									b bit 0 set to 0: "standard" - power connections made to the lower terminals of the circuit breaker **b** bit set to 1: "reverse" - power connections made to the upper terminals of the circuit breaker	
									The direction may be modified by the control unit or by directly writing to the register after obtaining the right (using a command).	
									Default value: 0 x 0000	
9741	2	R/W	x1	kW	MOD 10000	5..500		P/H	pickup for the maximum reverse power rP max	RevPwr_PuValue
									Default value: 500 kW	
9743	1	R/W	x0.1	s	INT	2..200		P/H	pickup delay for the maximum reverse power rP max	RevPwr_PuDelay
									Default value: 200 (20 s)	
9744	2	R/W	x1	kW	MOD 10000	5..500		P/H	dropout for the maximum reverse power rP max	RevPwr_DoValue
									b maximum limited to RevPwr_PuValue **b** default value: 500 kW	
9746	1	R/W	x0.1	s	INT	10..3600		P/H	dropout delay for the maximum reverse power rP max	RevPwr_DoDelay
									Default value: 10 (1 s)	
9747	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	RevPwr_LogAction
9748	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay	RevPwr_ActuAction
									b If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	

							b minimum frequency Alarm N°1026				F min protection

register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	label
9749	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF) Default value: 0x0101	UnderFreq_Status
9751	2	R/W	x0.1	Hz	MOD 10000	450.. 5400		P/H	pickup for the minimum frequency F min **b** maximum limited to OverFreq.PuValue default value: 450 (45 Hz)	UnderFreq_PuValue
9753	1	R/W	x0.0 1	s	INT	20..500		P/H	pickup delay for the minimum frequency F min Default value: 500 (5 s)	UnderFreq_PuDelay
9754	2	R/W	x0.1	Hz	MOD 10000	450.. 4400		P/H	dropout for the minimum frequency F min **b** minimum limited to UnderFreq_PuValue **b** default value: 450 (45 Hz)	UnderFreq_DoValue
9756	1	R/W	x0.0 1	s	INT	100.. 3600		P/H	dropout delay for the minimum frequency F min Default value: 100 (1 s)	UnderFreq_DoDelay
9757	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	UnderFreq_LogAction
9758	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay **b** If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	UnderFreq_ActuAction

						b maximum frequency Alarm N°1027				F max protection	

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9759	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm or protection active) 0x0101 (OFF)	OverFreq_Status
									Default value: 0x0101	
9761	2	R/W	x0.1	Hz	MOD 10000	450.. 5400		P/H	pickup for the maximum frequency F max	OverFreq_PuValue
									b minimum limited to UnderFreq.PuValue **b** default value: 650 (65 Hz)	
9763	1	R/W	x0.01	s	INT	20..500		P/H	pickup delay for the maximum frequency F max	OverFreq_PuDelay
									Default value: 500 (5 s)	
9764	2	R/W	x0.1	Hz	MOD 10000	450.. 4400		P/H	dropout for the maximum frequency F max	OverFreq_DoValue
									b maximum limited to OverFreq_PuValue **b** default value: 650 (65 Hz)	
9766	1	R/W	x0.01	s	INT	100.. 3600		P/H	dropout delay for the maximum frequency F max	OverFreq_DoDelay
									Default value: 100 (1 s)	
9767	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	OverFreq_LogAction
9768	1	R/W	-	-	INT	Bitmap 16		P/H	actions linked to overrun of set point at the end of the delay	OverFreq_ActuAction
									b If bit 0 is set to 1, the circuit breaker trips **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	

						b phase rotation alarm		Alarm N° 1028		

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9769	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm active) 0x0101 (OFF)	PhaRot _Status
									Default value: 0x0101	
9771	2	R/W	-	-	MOD 10000	{0, 1}		P/H	**b** 0: pickup if the detected rotation is Ph1, Ph3, Ph2 **b** 1: pickup if the detected rotation is Ph1, Ph2, Ph3 Default value: 0	PhaRot_PuValue
9777	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	PhaRot_LogAction
9778	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** bit 0: always set to 0 (trip disabled for this type of alarm) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	PhaRot_ActuAction

									b load shedding and reconnection based on current	Alarm N°1029
register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	description	Label
9779	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm active) 0x0101 (OFF) Default value: 0x0101	Shedl_Status
9781	2	R/W	x1	%	MOD 10000	50..100		P/H	pickup for load shedding and reconnection based on current, expressed as a % of the long-time Ir set point Default value: 100%	Shedl_PuValue
9783	1	R	x1	%Tr	INT	20..80		P/H	pickup delay for load shedding and reconnection based on current, expressed as a % of the long-time delay tr set point (20 to 80%) Default value: 80%	Shedl_PuDelay
9784	2	R	x1	%	MOD 10000	30..100		P/H	dropout for load shedding and reconnection based on current, expressed as a % of the long-time Ir set point Default value: 100%	Shedl_DoValue
9786	1	R	x1	S	INT	10.. 600		P/H	dropout delay for load shedding and reconnection based on current Default value: 10 s	Shedl_DoDelay
9787	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	Shedl_LogAction
9788	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** bit 0: always set to 0 (trip disabled for this type of alarm) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	Shedl_ActuAction

						b load shedding and reconnection based on power				Alarm N°1030

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9789	1	R/W	-	-	INT	0x0001 & 0x0101		P/H	0x0001 (Alarm active) 0x0101 (OFF) Default value: 0x0101	ShedPwr_Status
9790	1	R/W*	-	-	INT	-			direction of active-power flow **b** bit set to 0: "standard" - power connections made to the lower terminals of the circuit breaker **b** bit set to 1: "reverse" - power connections made to the upper terminals of the circuit breaker The direction may be modified by the command interface or by directly writing to the register after obtaining the right (using a command). Default value: 0 x 0000	ShedPwr_Config
9791	2	R/W	x1	kW	MOD 10000	200.. 10000		P/H	pickup for load shedding and reconnection based on power Default value: 10 MW	ShedPwr_PuValue
9793	1	R/W	x1	s	INT	10..3600		P/H	pickup delay for load shedding and reconnection based on power Default value: 3600 s	ShedPwr_PuDelay
9794	2	R/W	x1	kW	MOD 10000	100.. 10000		P/H	dropout for load shedding and reconnection based on power Default value: 10 MW	ShedPwr_DoValue
9796	1	R/W	x1	s	INT	10..3600		P/H	dropout delay for load shedding and reconnection based on power Default value: 10 s	ShedPwr_DoDelay
9797	1	R/W	-	-	INT	Bitmap 16		H	actions linked to overrun of set point at the end of the delay Register set to 0x0100 will Log the Wave Form into the Fault Wave Form Capture file (file N°22)	ShedPwr_LogAction
9798	1	R/W	-	-	INT	Bitmap 16		P/H	List of pick-up actions linked to overrun of set point at the end of the delay **b** bit 0: always set to 0 (trip disabled for this type of alarm) **b** If bit 8 is set to 1, contact No. 1 on an M2C or M6C module is closed **b** If bit 9 is set to 1, contact No. 2 on an M2C or M6C module is closed **b** If bit 10 is set to 1, contact No. 3 on an M6C module is closed **b** If bit 11 is set to 1, contact No. 4 on an M6C module is closed **b** If bit 12 is set to 1, contact No. 5 on an M6C module is closed **b** If bit 13 is set to 1, contact No. 6 on an M6C module is closed Default value: 0x0000 – no action	ShedPwr_ActuAction

Relay configuration M2C/M6C

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label
9800	1	R	-	-	INT	{0, 1}		P/H	**b** bit set to 1: indicates that remote access for configuration was authorised via the menu using the keypad on the control unit. **b** bit set to 0: indicates that remote access for configuration was not authorised via the menu using the keypad on the control unit. Default value: 0	eeRemoteAccess
9801	1	R/W	-	-	INT	{0,1,2,3,4}		P/H	**b** 0: normal (non-latching) mode, contact activated each time for as long as the alarm remains active. **b** 1: latching mode, contact activated for each alarm and remains activated until the alarm is rest by the user (via the command interface or by a reset on the control unit). **b** 2: time-delay mode, contact activated for a set time for each alarm. It is deactivated at the end of the time delay, whether the alarm is still active or not. The alarm must change status at least once to activate the contact again. **b** 3: forced to 1, the contact remains closed and is not controlled by the alarm status. 4: forced to 0, the contact remains open and is not controlled by the alarm status. Default value: 0x0001 (latching mode)	eeRelay[0]_Mode
9802	1	R/W	x0.1	s	INT	10..3600		P/H	contact activation delay for time-delay mode. Default value: 3600 (360 s)	eeRelay[0]_Duration
9803	4	R/W	-	-	ASCII	0x00.. 0x7F		P/H	contact name in ASCII (A..Z and 0..9) using four characters. Update via the control unit not possible. Default value: "set up!".	eeRelay[0]_Label
9807	1	R/W	-	-	INT	1000, ..1031		P/H	owner alarm number for the contact of the first relay. See alarm number in the section appendix : trip/alarm history. Default value: 0x8000 (no owner)	eeRelay[0]_Owner
9808	7	:	:	:	:	:		P/H	register configuration identical to registers 9801 to 9807	EeRelay[1]_Owner
9815	7	:	:	:	:	:		P/H	register configuration identical to registers 9801 to 9807	EeRelay[2]_Owner
9822	7	:	:	:	:	:		P/H	register configuration identical to registers 9801 to 9807	EeRelay[3]_Owner
9829	7	:	:	:	:	:		P/H	register configuration identical to registers 9801 to 9807	EeRelay[4]_Owner
9836	7	:	:	:	:	:		P/H	register configuration identical to registers 9801 to 9807	EeRelay[5]_Owner

Table of registers
Protection manager @ xx + 100

Relay configuration M2C/M6C

register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	Description	label
9843	1	R	-	-	INT	{0,2,6}		P/H	type of output module **b** 0: none **b** 2: M2C **b** 6: M6C Selection is automatic, depending on the type of module installed. Data always supplied.	HwRelayModuleType
9846	8	R	-	-	-	-		P/H	circuit-breaker characteristics The data may be supplied: **b** by the user via the circuit-breaker selection menu using the keypad on the Micrologic P control unit; **b** by downloading the characteristics using the test kit. The following registers then contain the circuit-breaker description in a comprehensible format: **b** BrCharacteristic[0]= standard: 0 = UL 1 = IEC 2 = ANSI **b** BrCharacteristic[1]= type: 0 = Masterpact 1 = Compact NS 2 = Powerpact **b** BrCharacteristic[2..7]= ASCII character strings (e.g. "NT08N"). Default value: 0X8000	BrCharacteristic

Event log

Registers 9900 to 9924 file N° 20   (see the section : Access to the files)

Maintenance event log

Registers 9932 to 9956 file N° 12   (see the section : Access to the files)

Fault Wave form Capture

Registers 9964 to 9989 file N° 22   (see the section : Access to the files)

Table of registers
Communication profile @ xx

Activation of the communication profile

Following registers are available only with a Breaker Communication Module firmware version greater or equal to V2.0 (register 577 must be greater or equal to 02000) and only if the communication profile has been activated. In order to activate the communication profile, it is necessary to set the register 800 to 1. Per default, the communication profile is not activated (register=0). When the communication profile is not activated, the content of the registers are not refreshed and therefore equal to 0x8000.

Registers written in **bold s** hall be refreshed every 50 ms
Registers written in **bold** shall be refreshed every 1.2 s
Registers written in *italic* shall be refreshed every 5 s

I/O status

b Breaker

Register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	Description	label	Origin
12000	1	R	-	-	Bitmap 16	-	A/E	P/H	Bitmap that indicates the validity of each bit in the BrStatus register Default value = 0x7F	BrStatusMask	new
12001	1	R	-	-	Bitmap 16	-	A/E	P/H	Circuit-breaker status: See details below	BrStatus	661

BrStatus bitmap detail :
Bit 0 (0x01) : OF ; Indication contacts
    For Compact and Masterpact : 0= Breaker is opened, 1 = Breaker is closed

Bit 1 (0x02) : SD ; Trip indication contact
    For Compact : 0 = no trip, 1 = Breaker has tripped due to electrical fault or Shunt trip
    For Masterpact : always 0

Bit 2 (0x04) : SDE ; Fault trip indication contact
    For Compact and Masterpact : 0 = no trip, 1 = Breaker has tripped due to electrical fault

Bit 3 (0x08) : CH ; Charged (used only with motor mechanism)
    For Compact : always 0
    For Masterpact : 0 = Spring discharged, 1 = Spring loaded

Bit 4 (0x10) : Reserved (internal use only)

Bit 5 (0x20) : PF ; Ready To Close
    For Compact : always 0
    For Masterpact : 0 = Not Ready To Close, 1 = Ready To Close

Bit 6 (0x40) : Compact / Masterpact differenciation
    0 = Compact NS , 1 = Masterpact

Bit 7-15 : Reserved

Nota : A bitmap mask should be used to test the Breaker status.
If a value test is used, the following values should be used for Mastepact :
0x44   Tripped discharged not RTC
0x4C   Tripped charged not RTC
0x50   OFF discharged not RTC
0x51   ON   discharged not RTC
0x59   ON   charged RTC
0x78   OFF charged RTC

b Input

Register	nbr of registers	read/write	scale	Unit	format	interval	A/E	P/H	Description	label	Origin
12002	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved	I_Mask	
12003	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved	I_Status	

b Tripping cause

Register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	Description	label	Origin
12004	1	R	-	-	INT	0..65535	A/E	P/H	Bitmap indicating cause of tripping by protection functions Bit 0: long-time protection. Bit 1: short-time protection Bit 2: instantaneous protection Bit 3: ground-fault protection Bit 4: earth-leakage protection Bit 5: DIN protection Bit 6: self-protection (temperature) Bit 7: self-protection (overvoltage) Bit 8: self-protection (ELA) or other protection (detailed in registers X+ 005) Bit 9-14 : reserved for future protection (soon available) *Bit 15 : NA if this bit is set and all others are cleared the data is unavailable*	MitopBasActCause	650
12005	1	R	-	-	INT	0..65535		P/H	Bitmap indicating cause of tripping by protection functions: Bit 0: current unbalance Bit 1: Over current phase 1 Bit 2 Over current phase 2 Bit 3: Over current phase 3 Bit 4: Over current on Neutral Bit 5: Under voltage Bit 6: Over voltage Bit 7: voltage unbalance Bit 8: Over power Bit 9: reverse power Bit 10: Under frequency Bit 11: Over frequency Bit 12: phase rotation Bit 13: load shedding based on current Bit 14: load shedding based on power *Bit 15 : NA if this bit is set and all others are cleared the data is unavailable*	MitopAdvActCause	651
12006	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		
12007	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		

b Alarming Setpoint

Register	nbr of registers	read/write	scale	unit	format	interval	A/E	P/H	Description	label	Origin
12008	1	R	-	-	INT	Bitmap 16		P/H	Status word for overrun of current-protection set points. This condition is reached as soon as the protection set point is overrun, even if the time delay has not expired. Bit 0: long-time and LT IDMTL protection If the bit is set to: 0: set-point overrun = False 1: set-point overrun = True	BasProtPickupStatus	8862
12009	1	R	-	-	INT	Bitmap 16		P/H	Status word for overrun of protection set points This condition is reached as soon as the protection set point is overrun, even if the time delay has not expired. Bit 0: current unbalance bit 1: maximum current on phase 1 bit 2: maximum current on phase 2 bit 3: maximum current on phase 3 bit 4: maximum current on the neutral bit 5: minimum voltage bit 6: maximum voltage bit 7: voltage unbalance bit 8: maximum power bit 9: reverse power bit 10: minimum frequency bit 11: maximum frequency bit 12: phase rotation bit 13: load shedding based on current bit 14: load shedding based on power	AdvProtPickupStatus	8863
12010	1	R	-	-	INT	Bitmap 16			Continuation of status word for overrun of advanced protection set points Bit 0: ground-fault alarm Bit 1: earth-leakage alarm	AdvXtedProtTripStatus	8864
12011	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		
12012	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		
12013	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		
12014	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		
12015	1	R	-	-	Bitmap 16	-	A/E	P/H	Reserved		

METERING

b Currents

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12016	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 1.	I_RMS[0]	1016
12017	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 2	I_RMS[1]	1017
12018	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 3	I_RMS[2]	1018
12019	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on the neutral[2]	I_RMS[3]	1019
12020	1	R	x1	A	INT	0..32767	A/E	P/H	maximum rms current in registers 816, 817, 818 and 819	I_Max	1020
12021	1	R	x1	A	INT	0..32767	A/E	P/H	ground-fault current If this current exceeds 32767 A, the register blocks at 32767 [3]	I_RMSGnd	1021
12022	1	R	x1	mA	INT	0..32767	A/E	P/H	earth-leakage current If this current exceeds 32767 A, the register blocks at 32767 [4]	I_RMSVigi	1022

[2] *Value not accessible when the configuration register 3314 selects type 31 or 40.*
[3] *Accessible only with Micrologic 5.0 P/H and 6.0 A/P/H*
[4] *Accessible only with Micrologic 7.0 A/P/H*

b Maximum Values of Currents

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12023	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 1.	Max_I_RMS[0]	1616
12024	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 2	Max_I_RMS[1]	1617
12025	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on phase 3	Max_I_RMS[2]	1618
12026	1	R	x1	A	INT	0..32767	A/E	P/H	rms current on the neutral[2]	Max_I_RMS[3]	1619
12027	1	R	x1	A	INT	0..32767	A/E	P/H	maximum rms current in registers 1016, 1017, 1018 and 1019	Max_I_Max	1620
12028	1	R	x1	A	INT	0..32767	A/E	P/H	ground-fault current If this current exceeds 32767 A, the register blocks at 32767 [3]	Max_I_RMSGnd	1621
12029	1	R	x1	mA	INT	0..32767	A/E	P/H	earth-leakage current If this current exceeds 32767 A, the register blocks at 32767 [4]	Max_I_RMSVigi	1622

[2] *Value not accessible when the configuration register 3314 selects type 31 or 40.*
[3] *Accessible only with Micrologic 5.0 P/H and 6.0 A/P/H*
[4] *Accessible only with Micrologic 7.0 A/P/H*

b Voltages

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12030	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-phase voltage V12	V_RMS[0]	1000
12031	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-phase voltage V23	V_RMS[1]	1001
12032	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-phase voltage V31	V_RMS[2]	1002
12033	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-neutral voltage V1N. [2]	V_RMS[3]	1003
12034	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-neutral voltage V2N. [2]	V_RMS[4]	1004
12035	1	R	x 1	V	INT	0..1200		P/H	rms phase-to-neutral voltage V3N. [2]	V_RMS[5]	1005

(2)   *Value not accessible when the configuration register 3314 selects type 31*

b Frequency

Register	nbr of registers	read/ write	scale	unit	format	Interval	A/E	P/H	description	label	Origin
12036	1	R	x10	Hz	INT	0..4000		P/H	system frequency	Frequency	1054
12037	1	R	x10	Hz	INT	0..4000		P/H	Maximum value of frequency	Max Frequency	1654

b Power

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12038	1	R	x1	kW	INT	0..32767		P/H	active power on phase 1 (1), (5)	ActivePwr[0]	1034
12039	1	R	x1	kW	INT	0..32767		P/H	active power on phase 2 (1), (5)	ActivePwr[1]	1035
12040	1	R	x1	kW	INT	0..32767		P/H	active power on phase 3 (1), (5)	ActivePwr[2]	1036
12041	1	R	x1	kW	INT	0..32767		P/H	total active power (5)	ActivePwr[3]	1037
12042	1	R	x1	kVAR	INT	0..32767		P/H	reactive power on phase 1 (1), (5)	ReactivePwr[0]	1038
12043	1	R	x1	kVAR	INT	0..32767		P/H	reactive power on phase 2 (1), (5)	ReactivePwr[1]	1039
12044	1	R	x1	kVAR	INT	0..32767		P/H	reactive power on phase 3 (1), (5)	ReactivePwr[2]	1040
12045	1	R	x1	kVAR	INT	0..32767		P/H	total reactive power (5)	ReactivePwr[3]	1041
12046	1	R	x1	kVA	INT	0..32767		P/H	apparent power on phase 1 with 3 wattmeters (1)	ApparentPwr[0]	1042
12047	1	R	x1	kVA	INT	0..32767		P/H	apparent power on phase 2 with 3 wattmeters (1)	ApparentPwr[1]	1043
12048	1	R	x1	kVA	INT	0..32767		P/H	apparent power on phase 3 with 3 wattmeters (1)	ApparentPwr[2]	1044
12049	1	R	x1	kVA	INT	0..32767		P/H	total apparent power	ApparentPwr[3]	1045

(1) *Value not accessible when the configuration register 3314 selects type 31.*
(5) *The sign of the active and reactive power depends on configuration register 3316*

b Energy

Register	Nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12050	2	R	x1	kWh	INT	+- 0..32767		P/H	total active energy	EeActiveEnergy	2000
12052	2	R	x1	kvarh	INT	+- 0..32767		P/H	total reactive energy	EeReactiveEnergy	2004
12054	2	R	x1	kWh	INT	0..32767		P/H	active energy positively incremented: unsigned value	EeActiveEnergyIn	2008
12056	2	R	x1	kWh	INT	0..32767		P/H	active energy negatively incremented: unsigned value	EeActiveEnergyOut	2012
12058	2	R	x1	kvarh	INT	0..32767		P/H	reactive energy positively incremented: unsigned value	EeReactiveEnergyIn	2016
12060	2	R	x1	kvarh	INT	0..32767		P/H	reactive energy negatively incremented: unsigned value	EeReactiveEnergyOut	2020
12062	2	R	x1	kVAh	INT	0..32767		P/H	total apparent energy	EeApparentEnergy	2024
12064	2	R	x1	kWh	INT	0..32767	E	-	Non resetable active energy positively incremented (reserved)	-	2028
12066	2	R	x1	kWh	INT	0..32767	E	-	Non resetable active energy negatively incremented (reserved)	-	2032
12068	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12069	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12070	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12071	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12072	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12073	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12074	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12075	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12076	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12077	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12078	1	R	x1	kWh	INT	0..32767		-	Reserved	-	
12079	1	R	x1	kWh	INT	0..32767		-	Reserved	-	

b Current demand

Register	nbr of registers	read/ write	scale	unit	Format	interval	A/E	P/H	description	label	Origin
12080	1	R	x1	A	INT	0..32767		P/H	current demand on phase 1	I_Dmd[0]	2200
12081	1	R	x1	A	INT	0..32767		P/H	current demand on phase 2	I_Dmd[1]	2201
12082	1	R	x1	A	INT	0..32767		P/H	current demand on phase 3	I_Dmd[2]	2202
12083	1	R	x1	A	INT	0..32767		P/H	current demand on the neutral [2]	I_Dmd[3]	2203

b Power demand

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12084	1	R	x1	kW	INT	0..32767		P/H	total active-power demand [7]	ActivePwrDmd	2224
12085	1	R	x1	kVAR	INT	0..32767		P/H	total reactive-power demand [7]	ReactivePwrDmd	2230
12086	1	R	x1	kVA	INT	0..32767		P/H	total apparent power demand [7]	ApparentPwrDmd	2236
12087	-	-	-	-	-	-		-	Available	-	-
12088	-	-	-	-	-	-		-	Available	-	-
12089	-	-	-	-	-	-		-	Available	-	-

[7] *Value updated at end of window for the "block" mode. For the "sliding" mode, the value is updated every 15 seconds.*

b Maximum values of Voltages

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12090	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-phase voltage V12	Max_V_RMS[0]	1600
12091	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-phase voltage V23	Max_V_RMS[1]	1601
12092	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-phase voltage V31	Max_V_RMS[2]	1602
12093	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-neutral voltage V1N. [1]	Max_V_RMS[3]	1603
12094	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-neutral voltage V2N. [1]	Max_V_RMS[4]	1604
12095	1	R	x 1	V	INT	0..1200		P/H	Max rms phase-to-neutral voltage V3N. [1]	Max_V_RMS[5]	1605

[1] *Value not accessible when the configuration register 3314 selects type 31*

b Power factor

Register	nbr of registers	read/ write	Scale	unit	format	interval	A/E	P/H	description	label	Origin
12096	1	R	x1000	none	INT	-1000.. +1000		P/H	power factor on phase 1 (absolute value equal to |P|/S) [1], [6]	PF[0]	1046
12097	1	R	x1000	none	INT	-1000.. +1000		P/H	power factor on phase 2 (absolute value equal to |P|/S) [1], [6]	PF[1]	1047
12098	1	R	x1000	none	INT	-1000.. +1000		P/H	power factor on phase 3 (absolute value equal to |P|/S) [1], [6]	PF[2]	1048
12099	1	R	x1000	none	INT	-1000.. +1000		P/H	total power factor (absolute value equal to |Ptotal|/Stotal) [6]	PF[3]	1049
12100	1	R	x1000	none	INT	-1000.. +1000		H	Fundamental power factor (its absolute value is equal to |FundP|/FundS. Sign convention the same as the one for the real power factor. N/A if type 31 network.	FundPF[0]	1050
12101	1	R	x1000	none	INT	-1000.. +1000		H	same as above phase B.	FundPF[1]	1051
12102	1	R	x1000	none	INT	-1000.. +1000		H	same as above phase C.	FundPF[2]	1052
12103	1	R	x1000	none	INT	-1000.. +1000		H	Total fundamental power factor (its absolute value is equal to |FundPtot|/FundStot). Sign convention the same as the one for the real power factor.	FundPF[3]	1053

[1] *Value not accessible when the configuration register 3314 selects type 31.*
[5] *The sign of the active and reactive power depends on configuration register 3316.*

b Total Harmonic Distortion

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12104	1	R	x10	%	INT	0..5000		H	Total harmonic distortion of Vab voltage compared to the fundamental.	THD_V[0]	1092
12105	1	R	x10	%	INT	0..5000		H	same as above Vbc	THD_V[1]	1093
12106	1	R	x10	%	INT	0..5000		H	same as above Vba	THD_V[2]	1094
12107	1	R	x10	%	INT	0..5000		H	Total harmonic distortion of Van voltage compared to the fundamental. – N/A with type 31 network.	THD_V[3]	1095
12108	1	R	x10	%	INT	0..5000		H	same as above Vbn	THD_V[4]	1096
12109	1	R	x10	%	INT	0..5000		H	same as above Vcn	THD_V[5]	1097
12110	1	R	x10	%	INT	0..5000		H	Total harmonic distortion of phase A current compared to the fundamental.	THD_I[0]	1098
12111	1	R	x10	%	INT	0..5000		H	same as above phase B. Measured with type 31.	THD_I[1]	1099
12112	1	R	x10	%	INT	0..5000		H	same as above phase C	THD_I[2]	1100
12113	1	R	x10	%	INT	0..5000		H	same as above Neutral – N/A with type 31 networks. Measured with type 41, calculated with type 40.	THD_I[3]	1101

12114 to 12145 are available
12146 to 12159 are reserved

| 12160 | 10 | R | | | INT | | | | Reserved | - | - |

b
12170 to 12145 are available

b Basic protection settings

Register	nbr of registers	read/ write	scale	unit	format	interval	A/E	P/H	description	label	Origin
12180	2	R	x1	A	MOD 10000	40..8000	A/E	P/H	Ir pickup for the long-time protection	LongTime_PuValue	8756
12182	1	R	x1	ms	INT	500. 24000	A/E	P/H	tr tripping delay for the long-time protection	LongTime_PuDelay	8758
12183	2	R	x1	A	MOD 10000	60.. 80 000	A/E	P/H	Isd pickup for the short-time protection	ShortTime_PuValue	8766
12185	1	R	x1	ms	INT	0..400	A/E	P/H	tsd tripping delay for the short-time protection 0 s valid only for the I²t off position 100 to 400 ms: valid for the I²t on and I²t off positions	ShortTime_PuDelay	8768
12186	1	R	x1	-	INT	0x0001 0x0101	A/E	P/H	0x0001 (protection active) 0x0101 (protection OFF) Default value = 0x0001	Instant_Status	8774
12187	2	R	x1	A	MOD 10000	200.. 120 000	A/E	P/H	I pickup for the instantaneous protection	Instant_PuValue	8776
12189	2	R	x1	A	MOD 10000	30..1200	A/E	P/H	Ig pickup for the ground-fault protection	Res_PuValue	8786
12191	1	R	x1	ms	INT	0..400	A/E	P/H	tg tripping delay for the ground-fault protection 0 s valid only for the I²t off position 100 to 400 ms: valid for the I²t on and I²t off positions	Res_PuDelay	8788
12192	2	R	x1	mA	MOD 10000	5..300	A/E	P/H	IΔN pickup for the earth-leakage protection	Vigi_PuValue	8796
12194	1	R	x1	ms	INT	0..1000	A/E	P/H	Δt tripping delay for the earth-leakage protection	Vigi_PuDelay	8798
12195	-	-	-	-	-	-		-	Available	-	-

b Circuit-Breaker ID

Register	nbr of registers	Read/ write	scale	unit	format	interval	A/E	P/H	Description	label	Origin
12196	4	R	1	-	Ascii	-	A/E	P/H	Serial number encoded in Adcii	EeSerialNumber	8700
12200	1	R	1	-	INT	-	A/E	P/H	Protection module firmware version	EeFWVersion	8710
12201	1	R	1	-	INT		A/E	P/H	Square D Identification number	EeSQD_Prod_ID	8716
									15131 = Micrologic A (PM)		
									151 X + = Micrologic P (PM)		
									15135 = Micrologic H (PM)		
									Default value = 0x8000		
12202	1	R	1	-	Ascii	20,30,40 50,60,70	A/E	P/H	Type of protection 20 = Micrologic 2.0,… 70 = Micrologic 7.0	EeUnitModelNum	8740
12203	1	R	1	-	Ascii	A,E,P,H	A/E	P/H	Type of control unit :A , P or H	EeUnitType	8741
12204	1	R	1	-	INT	0..15	A/E	P/H	Type of long time rating plug	HwLT_PlugType	8742
									0 = missing, 1= IEC standard; 2 = IEC low ; 3 = IEC High ; 10 = OFF ; 7 = UL-A ; 8 = UL-B ; 9 = UL-C ; 11= UL-D ; 12 = UL-E ; 13 = UL-F ; 14 = UL-G ; 15 = UL-H		
12205	1	R	x1	A	INT	0..8000	A/E	P/H	rated circuit-breaker current Default value: 100 A (circuit-breaker sensor plug not present)	HwBrNominalCurrent	8750
12206	1	R/W	x1	notch	INT	0..3	A/E	P/H	type of neutral protection 0: OFF 1: N/2 (Ir/2) 2: N (Ir) 3: Nx1.6 (1.6xIr)	EeNeutralProtType	8753
12207	1	R	-	-	INT	0..65535	A/E	P/H	counter for total number of operations (OF): the counter increments when bit 0 in register 661 switches from 0 to 1.[1]	CtrOF_OvrLife	662
12208	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (OF) since last reset: the counter increments when bit 0 in register 661 switches from 0 to 1.[1]	CtrOF	663
12209	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (SD): the counter increments when bit 1 in register 661 switches from 0 to 1.[1]	CtrSD	664
12210	1	R	-	-	INT	0..65535	A/E	P/H	counter for operations (SDE): the counter increments when bit 2 in register 661 switches from 0 to 1.[1]	CtrSDE	665

b Miscellaneous

Register	nbr of registers	Read/ write	scale	unit	format	interval	A/E	P/H	Description	label	Origin
12211	1	R	-	-	INT	1..8000	-	P/H	Number of first (oldest) record in the protection-manager event log (file N°20)	CurrentFirstRecord OfPM_EvtLog	623
12212	1	R	-	-	INT	1..8000	-	P/H	Number of last (most recent) record in the protection-manager event log (file N°20)	CurrentLarstRecord OfPM_EvtLog	624
12213	2	R	x0.1	s	MOD 10000	-		P/H	time remaining before long-time tripping	TimeLeftUntilLT_Trip	886
12215	4	R	1	%	INT	0..32767		P/H	Contact wear indicator per phase (Default value = 0x8000) The contacts must be inspected each time the counter reaches a hundred mark. The message "Not available or circuit-breaker type not defined" is displayed if the type of the circuit-breaker has not been defined. In this case, see "Breaker selection" in the Micrologic set-up menu.See register 9846	PhaseContactWear	909

List of commands
Chassis manager commands

Chassis-manager commands

Cmd #	Description	Parameter(s)	Mode	Label
57856	Preset Breaker Status Counters	P1 = control word read in register 553 P2 = bitmap of counter to Preset [3] P3 = Counter value 1 [4] P4 = Counter value 2 [4] P5 = Counter value 3 [4]	Protected	PresetBrStatCtr
61541	Set time and date for chassis manager Year YY is 0 for 1900, 100 for 2000, 101 for 2001, etc.	P1 = MM:DD P2 = YY:HH P3 = MIN:SEC	Shared Protected	SetD_T

[3] *Bitmap of counter to Preset*

Bit		Breaker counter status	Affected counter registers	
8	(0x0100)	CD : Disconnected position	663	@ xx + 50
9	(0x0200)	CE : Connected position	662	@ xx + 50
10	(0x0400)	CT : Test position	664	@ xx + 50

[4] *Control Value 1 = Value of counter corresponding to 1st bit set when bitmap is read from LSB to MSB (0000 to reset counter)*

Control Value 2 = Value of counter corresponding to next bit set when bitmap is read from LSB to MSB (0000 to reset counter)

List of commands
Circuit-breaker manager commands

Cmd #	Description	Parameter(s)	Mode	Label
57394	Enter configuration mode	P1 = 3 [1] P2 = 4 [2] P3 = control word read in register 533 of the circuit-breaker manager	Protected	In_CommCfg
57395	Exit configuration mode and activate the new parameters.	P1 = 3 [1] P2 = 4 [2] P3 = control word read in register 533 of the circuit-breaker manager	Protected	Out_CommCfg
57400	Simplified Open/Close	P1 = 4 [1] P2 = 4 [2] P3 = 0 or 1 (0 for Open ; 1 for Close) P4 = password (default value= 0000)	Shared	Open/Close
57856	Preset Breaker Status Counters	P1 = 5 to 10 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = bitmap of counter to Preset [3] P5 = Counter value 1 [4] P6 = Counter value 2 [4] P7 = Counter value 3 [4] P10 = Counter value 6 [4]	Protected	PresetBrStatCtr
57857	Preset Coils Operation Counters	P1 = 6 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = bitmap for coil control [5] P5 = MX Counter value (0000 to reset) P6 = XF Counter value (0000 to reset)	Protected	PresetCoilCtr
58769	Open circuit breaker using MX coil	P1 = 4 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = 1	Shared Protected	OpenBr
58770	Close circuit breaker using XF coil	P1 = 4 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = 1	Shared Protected	CloseBr
58771	Authorise activation of MX or XF coils, or both	P1 = 4 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = bitmap for coil-control [5]	Protected	EnCoilsactivation
58772	Disable activation of MX or XF coils, or both	P1 = 4 [1] P2 = 4 [2] P3 = control word read in register 553 P4 = bitmap for coil- control [5]	Protected	EnCoilsdesactivation
59492	Release flag for access to protected mode	P1 = 3 [1] P2 = 4 [2] P3 = flag active	Protected	ReleaseProt Flag
61541	Set time and date for circuit-breaker manager and the protection and measurement managers Year YY is 0 for 1900, 100 for 2000, 101 for 2001, etc.	P1 = 5 [1] P2 = 4 [2] P3 = MM:DD P4 = YY:HH P5 = MIN:SEC	Shared Protected	SetD_T

[1] Parameter P1 for the circuit-breaker manager command interface contains the total number of command parameters, including P1.
[2] The value "4" for parameter P2 informs the circuit-breaker manager command interface that it must run the command itself.
[3] Bitmap of counter to Preset

Bit	Breaker counter status	Affected counter registers
0 (0x0001)	OF : ON/OFF	663
1 (0x0002)	SD : Trip indication	664
2 (0x0004)	SDE : Fault-trip indication	665

[4] Control Value 1 = Value of counter corresponding to 1st bit set when bitmap is read from LSB to MSB (0000 to reset counter)
Control Value 2 = Value of counter corresponding to next bit set when bitmap is read from LSB to MSB (0000 to reset counter)
[5] Bitmap for coil control

Bit	Coil control status	Affected counter registers
1 (0x0002)	MX coil-control bit	674
2 (0x0004)	XF coil-control bit	678
3 (0x0008)	To be set to 1 in order to activate MX or XF	

Cmd #	Description	Parameter(s)	Mode	Label
53298	Enter configuration mode	P1 = 3 [1] P2 = 8 [2] P3 = control word read in register 3300 of the metering manager	Protected	In_mCfg
53299	Exit configuration mode and activate the new parameters.	P1 = 3 [1] P2 = 8 [2] P3 = control word read in register 3300 of the metering manager	Protected	Out_mCfg
61952	Reset minimeters / maximeters in the metering manager	P1 = 4 [1] P2 = 8 [2] P3 = bitmap of minimeters to reset [3] P4 = bitmap of maximeters to reset [3]	Protected	Reset_m_M
53762	Reset of current demand maximums	P1 = 3 [1] P2 = 8 [2] P3 = bitmap of maximum values to reset [4]	Protected	ResetI_PeakDmd
53763	Reset of power demand maximums	P1 = 3 [1] P2 = 8 [2] P3 = bitmap of maximum values to reset [5]	Protected	ResetP_PeakDmd
53760	Preset or reset the energy counters	P1 = 3 to 32 [1] P2 = 8 [2] P3 = bitmap of counters to preset or reset [6] P4 to P7 = first counter to preset according to P3 P8 to P11 = second counter to preset according to P3 P28 to P32 = seventh counter to preset according P3.	Protected	PresetAccEnCtr
55234	Forcelog into WFC (file N° 5)	P1 = 4 [1] P2 = 8 [2] P3 = bitmap of file N° 5 = 0x0000 P4 = bitmap of file N° 5 = 0x0010	Shared Protected	Forcelog

[1] *Parameter P1 for the circuit-breaker manager command interface contains the total number of command parameters, including P1.*
[2] *The value "8" for parameter P2 informs the circuit-breaker manager command interface that the metering manager must run the command.*
[3] *Bitmap for reset of minimeters / Maximeters*

Bit	minimeters / Maximeters	Affected real-time measurement registers
0 (0x0001)	Currents	1016 to 1027
1 (0x0002)	Current unbalance	1028 to 1032
3 (0x0008)	Voltages	1000 to 1007
4 (0x0010)	Voltage unbalance	1008 to 1015
6 (0x0040)	Frequency	1054
7 (0x0080)	Power, PF	1034 to 1053
11 (0x800)	Fundamental, THD	1056 to 1118
13 (0x2000)	V_Crest	1119 to 1124
14 (0x4000)	I_Crest	1125 to 1128

[4] *Bitmap for reset of current demand maximums*

Bit	Maximum of current demand	Affected data registers
1 (0x0002)	Phase 1	2204 + 3005 to 3007 + 3026 to 3028
2 (0x0004)	Phase 2	2205 + 3008 to 3010 + 3026 to 3028
3 (0x0008)	Phase 3	2206 + 3011 to 3013 + 3026 to 3028
4 (0x0010)	Neutral	2207 + 3014 to 3016 + 3026 to 3028

[5] *Bitmap for reset of power demand maximums*

Bit	Maximums of Power demand	Affected data registers
4 (0x0010)	Active power	2225 to 2229 + 3017 to 3019 + 3029 to 3031
8 (0x0100)	Reactive power	2230 to 2235 + 3020 to 3022 + 3029 to 3031
12 (0x1000)	Apparent power	2236 to 2241 + 3023 to 3025 + 3029 to 3031

[6] *A number of counters may be preset or reset at the same time. Each counter is coded over four 16-bit registers.*
The counters to be preset are indicated in the bitmap. The values to be preset are transmitted as parameters, in the same order as the bits set to one, starting with the least significant. The number of counters to be transmitted is equal to the number of bits set to one in the bitmap.

Bit	Energy counter	Affected data registers
0 (0X0001)	All the counters are simply reset	
1 (0X0002)	Total Active-Energy	2000 to 2003
2 (0X0004)	Total Reactive-Energy	2004 to 2007
3 (0X0008)	Total Active-Energy IN (positively incremented)	2008 to 2011
4 (0X0010)	Total Active-Energy OUT(negatively incremented)	2012 to 2015
5 (0X0020)	Total Reactive-Energy IN (positively incremented)	2016 to 2019
6 (0X0040)	Total Reactive-Energy OUT(negatively incremented)	2020 to 2023
7 (0X0080)	Total Apparent-Energy	2024 to 2027

Cmd #	Description	Parameter(s)	Mode	Label
49202	Enter configuration mode	P1 = 3 [1] P2 = 2 [2] P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000)	Protected	In_pCfg
49203	Exit configuration mode and activate the new parameters.	P1 = 3 [1] P2 = 2 [2] P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000)	Protected	Out_pCfg
50579	"Release" of a relay on optional M2C or M6C module, set to latching mode. Release is effective if the alarm that tripped contact closing is no longer active.	P1 = 4 [1] P2 = 2 [2] P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000) P4 = bitmap of the relay to release [4]	Protected	ReleaseRly
50580	"Energize" a relay of an optional M2C or M6C module.	P1 = 4 [1] P2 = 2 [2] P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000) P4 = bitmap of the relay to energizet [4]	Protected	EnergizeBr
63176	Clear the files Note : In order to clear a file, it is mandatory to disable the file before.	P1 = 4 [1] P2 = 2 [2] P3 = bitmap of file reference [5] P4 = bitmap of file reference [5]	Shared Protected	ClearFiles
63377	Disable access to files	P1 = 4 [1] P2 = 2 [2] P3 = bitmap of file reference [5] P4 = bitmap of file reference [5]	Shared Protected	DisFiles
63178	Read a record in the event log of the protection manager (file No. 20). The contents of the record is available starting in register 7730.	P1 = 4 [1] P2 = 2 [2] P3 = 20 (Number of the file to be read) P4 = number of event to be read	Protected	ReadFileX_RecY
63376	Enable access to files	P1 = 4 [1] P2 = 2 [2] P3 = bitmap of file reference [5] P4 = bitmap of file reference [5]	Shared Protected	EnFiles

[1] Parameter P1 for the circuit-breaker manager command interface contains the total number of command parameters, including P1.
[2] The value "2" for parameter P2 informs the circuit-breaker manager command interface that the protection manager must run the command.
[4] Bit 0 corresponds to relay S1 (M2C or M6C option), bit 1 corresponds to relay S2 (M2C or M6C option), bits 2 to 5 correspond respectively to relay S3 to S6 on the M6C module.

(5) event log of the protection manager (File N°20)	P3=0x0008	P4=0x0000
event log of the metering manager (File N°10)	P3=0x0000	P4=0x0200
Maintenance event log of theprotection manager(File N°21)	P3=0x0010	P4=0x0000
Maintenance event logof the metering manager (File N°12)	P3=0x0000	P4=0x0800
Min-Max event log of the metering manager (File N°11)	P3=0x0000	P4=0x0400
event log of the circuit-breaker manager (File N°30)	P3=0x2000	P4=0x0000
Wave form Capture (File N°5)	P3=0x0000	P4=0x0010
Fault .Wave form Capture (File N°22)	P3=0x0020	P4=0x0000

Examples of commands
Send commands in shared mode
Simplified Open/Close

b step 1 : **Fill in Parameters**

<table>
<tr><td>Command number : 57400

Simplified Open/close</td></tr>
</table>

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be written**
7700	57400 (command number)
7701	P1 = 4 (total number of parameters including P1)
7702	P2 = 4 (circuit-breaker manager)
7703	P3 = 0 for Open or P3 = 1 for Close
7704	P4 = 0000 (Password default value)

b step 2 : **Write command**
WRITE the previous registers by using function 16 of Modbus protocol

After receiving the command, the status command register (802 for Open ; 803 for close) is set to 1 if the simplified Open/Close command has been accepted by the Circuit-Breaker manager.
Following table gives the values set in the Status command register.

Value	Label	Use case
1	RES_OK	Command accepted
2	ERR_NBR_PARAM	Incorrect number of parameters
3	ERR_COIL_ID_VALUE	Incorrect coilValue (must be 0 o
4	ERR_COIL_PASSWORD_VALUE	Incorrect password value
5	ERR_MANU	Register 670 in MANU mode

WARNING :   Simplified OPEN/CLOSE command are available only with a
Breaker Communication Module firmware version greater or
equal to V2.0 (register 577 must be greater or equal to 02000).
It is necessary to be in AUTO mode (see register 670)

Examples of commands
Send commands in protected mode

b step 1 : **Request the flag**

READ the following registers by using function 3 of Modbus protocol

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7715 [(1)]	flag. The value read must be different than 0 to go on to the next step.

[(1)] The value read in register 7715 is called a "flag". If it is zero, another supervisor on a multi-supervisor system is already in configuration mode. You must wait for the flag to be different than zero before starting to configure.

b step 2 : **Fill in Parameters**

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be written**
7720	Command number to be written (see the section : List of commands)
7721	P1 = total number of parameters to be send (including P1)
7722	P2 = identification of the micrologic manager. Protection mgr=2, circuit-breaker mgr=4, metering mgr=8
7723 to 7729	P3 to P9 = parameters specific to the command

b step 3 : **Write command**

WRITE the previous registers by using function 16 of Modbus protocol

b step 4 : **Wait for the command being executed**

READ the following registers by using function 3 of Modbus protocol

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7717	command is active: as long as the command is being executed, the datum is **the command number**. When command execution is finished, the datum is 0.
7718	command executed: as long as the command is being executed, the datum is 0. When command execution is finished, the datum is **the command number**.

Repeat readings until command execution is **finished**.

b step 5 : **Check Result code**

READ the following registers by using function 3 of Modbus protocol

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7719	result codes for the executed command, descripted in register 7719. Refer to the command result-code table for information on the meaning of the result codes. (See the section : Send command in protected mode)

b step 6 : **Release the flag**

WRITE the following registers by using function 16 of Modbus protocol

Command number : 59492
ReleaseProtFlag

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be written**
7720	**59492** (command number)
7721	P1 = 3 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = flag (value read in register 7715 at step 1)

Open the circuit breaker

Some preliminary operations are required to send the command.
On the menu of Micrologic P or H control unit, within « Com set up » menu, Remote control must be set to Auto (Register 670 must be equal to 1).
Then circuit breaker may be remotely controlled.
Caution, to open the circuit breaker using the COM option, the device must be equipped with an MX « communicating » voltage release.
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 : **Get Control word**
Read the control word in register 553 of the circuit-breaker manager

b step 3 : **Enable activation of the MX coil**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58771** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 10 (0x000A) See bitmap for MX coil control

Command number : 58771
EnCoilactivation

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**

b step 6 : **Open the circuit-breaker**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58769** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 1

Command number : 58769
OpenBr

b step 7 : **Wait for the command being executed**

b step 8 : **Check Result code**

b step 9 : **Disable activation of the MX coil**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58772** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 10 (0x000A) See bitmap for MX coil control

Command number : 58772
DisCoilactivation

b step 10 : **Wait for the command being executed**

b step 11 : **Check Result code**

b Step 12 : **Return the flag**

Close the circuit breaker

Some preliminary operations are required to send the command.
On the menu of Micrologic P or H control unit, within « Com set up » menu, Remote
control must be set to Auto (Register 670 must be equal to 1)
Then circuit breaker may be remotely controlled.
Caution, to close the circuit breaker using the COM option, the device must be
equipped with an XF « communicating » voltage release.
Note : For the standard steps such as Request the flag, Wait for command being
executed, Check result code and Return the flag, please refer to the first example of
command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 **: Get Control word**
Read the control word in register 553 of the circuit-breaker manager

Command number : 58771

EnCoilactivation

b step 3 : **Enable activation of the XF coil**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58771** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 12 (0x000C) See bitmap for XF coil control

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**

Command number : 58770

CloseBr

b step 6 : **Close the circuit-breaker**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58770** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 1

b step 7 : **Wait for the command being executed**

b step 8 : **Check Result code**

Command number : 58772

DisCoilactivation

b step 9 : **Disable activation of the XF coil**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**58772** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = Content of Control word read in step2 (register 553)
7724	P4 = 12 (0x000C) See bitmap for XF coil control

b step 10 : **Wait for the command being executed**

b step 11 : **Check Result code**

b Step 12 : **Return the flag**

Set the time and synchronise the protection and metering managers

When the time is set for the COM option, it in turn automatically sets the time for the protection and metering managers.

Each time the supervision-system and COM-option clocks are synchronised, the COM option automatically synchronises with the protection and metering managers.

Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

Set the time and synchronise the circuit-breaker manager

The time set for the circuit-breaker manager is automatically used for the protection and metering managers.

To set the time, proceed as follows.

b step 1 : **Request the flag**

b step 2 : **Set Date Time of the Breaker Communication Module**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be write**
7720	**61541** (command number)
7721	P1 = 5 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 : bits 15 to 8 = month (1 to 12) P3 : bits 7 to 0 = day (1 to 31)
7724	P4 : bits 15 to 8 = year (0 to 199, 0 represents 1900, 102 represents 2002) P4 : bits 7 to 0 hours (0 to 23)
7725	P5 : bits 15 to 8 = minutes (0 to 59) P5 : bits 7 to 0 = seconds (0 to 59)

Command number : 61541

SetD_T

b step 3 : **Wait for the command being executed**

b step 4 : **Check Result code**

b Step 5 : **Return the flag**
Depending on the procedure used to synchronise the system clocks, it is advised to: broadcast the time-setting command

Set the time and synchronise the chassis manager

The time must be set for the chassis manager even if the circuit-breaker manager is already set.

Follow the same procedure described for the circuit-breaker manager

Warning : when sending a command to the CCM (Chassis Communication Module), you do not have to fill the two first parameter (P1 = Number of parameter and P2 = ID of the manager)

WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave	Address @ [circuit-breaker manager] + 50
Register	**Datum to be write**
7720	**61541** (command number)
7721	P1 : bits 15 to 8 = month (1 to 12) P1 : bits 7 to 0 = day (1 to 31)
7722	P2 : bits 15 to 8 = year (0 to 199, 0 represents 1900, 102 represents 2002) P2 : bits 7 to 0 hours (0 to 23)
7723	P3 : bits 15 to 8 = minutes (0 to 59) P3 : bits 7 to 0 = seconds (0 to 59)

Command number : 61541

SetD_T

Write settings of the long time protection

By setting the protection manager to configuration mode, it is possible to write the setup registers (8754 to 8803 and 9604 to 9798). The new configuration is not taken into account until after exiting configuration mode.
Some preliminary operations are required to send the command.
On the Micrologic P or H front panel, within « Com set up » menu, Remote access must be set to Yes (Register 9800 must be equal to 1).
Then enter the access code. The protection-manager configuration is protected by this access code that may be programmed and viewed exclusively on the Micrologic front panel. This password must be noted before starting. Default access code is 0000. Then you can acces the configuration mode.
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1: **Request the flag**

b step 2 : **Acces the configuration mode**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**49202** (command number)
7721	P1 = 3 (total number of parameters including P1)
7722	P2 = 2 (protection manager)
7723	P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000)

Command number : 49202

In_pCfg

b step 3 : **Wait for the command being executed**

b step 4 : **Check Result code**

b step 5 : **Enter new settings**
For the fine adjustments of the long time, short time, instantaneous, ground fault, and earth leakage protection functions, you have to WRITE the following registers (8754 to 8803) at the address @+100[Protection Manager] by using function 6 or 16 of Modbus protocol. If you change the Ir setting, you have to change accordingly the Isd setting since Isd expressed in Amps = (Isd rotary switch position) x Ir

For example with the long time Protection settings (assuming a 1000 Amps breaker)
Write 850 into register 8756 and 0 into register 8757 will set 850 Amps as fine adjustment for Ir setting (assuming Ir rotary switch set at position .9 or higher)
Write 1500 into register 8758 will set 1.5 s as fine adjustment for tr setting (assuming tr rotary switch set at position 2 or higher).
Write 3400 into register 8766 and 0 into register 8767 will set 3400 Amps (3400 = 850x4) as fine adjustment for Isd setting (assuming Isd rotary switch set at position 4 or higher).
Write 0x0100 into register 8762 will actuate the log of the long timt protection into the Fault Wave Form capture (File N°22).

b step 6 : **Exit the configuration mode**
WRITE the following registers by using function 16 of Modbus protocol

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**49203** (command number)
7721	P1 = 3 (total number of parameters including P1)
7722	P2 = 2 (protection manager)
7723	P3 = Access code to be consulted in the menu of the control unit :Com set-up / Remote access (default value is 0000)

Command number : 49203

Out_pCfg

b step 7 : **Wait for the command being executed**

b step 8 : **Check Result code**

b Step 9 : **Return the flag**

b Step 10 : **Check new settings**
READ the contents of the registers (8754 to 8803) by using function 3 of Modbus protocol. The settings should be those entered in step 5.

Reset the current and Voltage maximeters in the metering manager

The minimeters / Maximeters of the real-time measurements are reset using the Reset_m_M command. This operation may be carried out at the same time as the reset for other maximeters. Precise operation depends on the parameters sent with the command. . (see the section Appendix List of commands in the metering manager).

Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 : **Do not Reset minimeters / Reset Maximeters for current and Voltage**
WRITE the following registers by using function 16 of Modbus protocol

Command number : 61952

Reset_m_M

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be read
7720	**61952** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 8 (Metering Manager)
7723	P3 = 0 (bitmap of minimeters to reset)
7724	P4 = 9 (bitmap of Maximeters to reset)

b step 3 : **Wait for the command being executed**

b step 4 : **Check Result code**

b step 5 : **Return the flag**

Preset the total active-energy and the total apparent energy

The Energy counter values are preset using the PresetAccEnCtr command. This operation may be carried out at the same time as the preset for active, reactive or apparent-Energy counter values. Precise operation depends on the parameters sent with the command. (see the section Appendix List of commands in the metering manager).

Follow the same procedure described for the circuit-breaker manager

b step 2 : **Preset of total Active energy counter to 8,0364,0905,0372 kWh and preset of total Apparent energy counter to 373,0904,0365,0009 kVAh**
WRITE the following registers by using function 16 of Modbus protocol .

Command number : 53760

PresetAccEnCtr

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be read	
7720	**53760** (command number)	
7721	P1 = 11 (total number of parameters including P1)	
7722	P2 = 8 (Metering Manager)	
7723	P3 = 130 (0x0082) preset active and apparent energy counter	
7724	P4 = 372 (0x174)	Register 2000
7725	P5 = 905 (0x0389)	Register 2001
7726	P6 = 364 (0x016c)	Register 2002
7727	P7 = 8 (0x0008)	Register 2003
7728	P8 = 9 (0x0009)	Register 2024
7729	P9 = 365 (0x016d)	Register 2025
7730	P10 = 904 (0x0388)	Register 2026
7731	P11 = 373 (0x175)	Register 2027

Read a recording in event log of the Circuit-Breaker Manager

The event log of the Circuit-Breaker Manager is file No. 30 .
This file is always enabled.
This file will record the events associated to the alarms (1000 to 1106)
The size of each recording and the valid recording numbers may be read in registers 718 to 743.
The event log of the circuit-breaker manager may be read using the standard read/write functions (3, 4, 6, 16, 23).
Simply follow steps. When the command is finished, the contents of the requested recording may be read starting in register 7730 (see format of the events in the event log of the circuit-breaker manager in the section : Access to the files.)
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 **: Read event log characteristics (status)**
Read the following registers by using function 3 of Modbus protocol
737 = Number of records in the file (0 = no record)
738 = Sequence number of first record (the oldest) in the file
739 = Sequence number of last record (the most recent)in the file

b step 3 **Read event log recording**
Write the following registers by using function 16 of Modbus protocol.

Command number : 63178

ReadFileX_RecY

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be read
7720	**63178** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 4 (circuit-breaker manager)
7723	P3 = 30 (number of the file to be read)
7724	P4 = number of the recording to be read, between the numbers of the oldest (738) and most recent (739) recordings, as per results in step2

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**
The requested recording may be read starting in registers **7730** (see format of the events in the event log of the circuit-breaker manager in the section : Access to the files) by using function 3 of Modbus protocol.
Repeat step 3 until all the records (737) have been read.

b step 6 : **Return the flag**

Read a recording in event log of the Metering Manager

The event log of the Metering Manager is file No. 10 .
This file is normally enabled (register 7164 = 0xFFFF). If not, you have to enable it by using the Command 63376 : EnFiles.
This file will record the events associated to the Analog pre-defined alarms (1 to 53). It is therefore mandatory to configure these alarm (See the example : Configure Analog pre-defined alarm n°1)
The size of each recording and the valid recording numbers may be read in registers 7164 to 7189.
The event log of the Metering Manager may be read using the standard read/write functions (3, 4, 6, 16, 23).
Simply follow steps. When the command is finished, the contents of the requested recording may be read starting in register 7730 (see format of the events in the event log of the circuit-breaker manager in the section : Access to the files.)
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 **: Read event log characteristics (status)**
Read the following registers by using function 3 of Modbus protocol
7183 = Number of records in the file (0 = no record)
7184= Sequence number of first record (the oldest) in the file
7185 = Sequence number of last record (the most recent) in the file

b step 3 **Read event log recording**
Write the following registers by using function 16 of Modbus protocol.

> *Command number : 63178*
> ## ReadFileX_RecY

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7720	**63178** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 8 (Metering Manager)
7723	P3 = 10 (number of the file to be read)
7724	P4 = number of the recording to be read, between the numbers of the oldest (7184) and most recent (7185) recordings, as per results in step2

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**
The requested recording may be read starting in registers **7730** (see format of the events in the event log of the circuit-breaker manager in the section : Access to the files) by using function 3 of Modbus protocol.
Repeat step 3 until all the records (register 7183) have been read.

b step 6 : **Return the flag**

Appendix

Examples of commands
Configure Analog pre-defined
Alarm n°1 : Over Current Phase A

Write settings of the Alarm n°1

By setting the metering manager to configuration mode, it is possible to write access the setup registers (6000 to 6624). The new configuration is not taken into account until after exiting configuration mode.
Some preliminary operations are required to send the command.
On the front panel of Micrologic P or H, within « Com set up » menu, Remote access must be set to Yes (register 9800 must be equal to 1).
Then read the control word. The metering-manager configuration is protected by a control word that may be read in register 3300.
Then you can acces the configuration mode.
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 **: Request the flag**

b step 2 **: Get Control word**
Read the control word in register 3300 of the metering manager

b step 3 : **Acces the configuration mode**
WRITE the following registers by using function 16 of Modbus protocol

Command number : 53298

In_mCfg

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**53298** (command number)
7721	P1 = 3 (total number of parameters including P1)
7722	P2 = 8 (metering manager)
7723	P3 = content of register 3300 read in step 2

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**

b step 6 : **Enter new settings**
For the adjustments of the analog pre-defined Alarm n°1, you have to WRITE the following registers (6000 to 6010) at the address @+200[Metering Manager] by using function 6 or 16 of Modbus protocol.
Write 0x0001 into register 6000 will activate the alarm n°1 (Over Current Phase A)
Write 900 into register 6003 will set the Pick-up value to 900 Amps
Write 7 into register 6005 will set the Pick-up time delay to 7 s
Write 650 into register 6006 will set the Drop-out value to 650 Amps
Write 11 into register 6008 will set the Drop-out time delay to 11 s
Write 0x0200 into register 6010 will actuate the log of Alarm n°1 into the Wave Form capture (file N° 5)

b step 7 : **Get Control word**
Read the control word in register 3300 of the metering manager

b step 8 : **Exit the configuration mode**
WRITE the following registers by using function 16 of Modbus protocol

Command number : 53299

Out_mCfg

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be write
7720	**53299** (command number)
7721	P1 = 3 (total number of parameters including P1)
7722	P2 = 8 (metering manager)
7723	P3 = content of register 3300 read in step 7

b step 9 : **Wait for the command being executed**

b step 10 : **Check Result code**

b Step 11 : **Return the flag**

b Step 12 : **Check new settings**
READ the contents of the registers (6000 to 6624) by using function 3 of Modbus protocol. The settings should be those entered in step 6.

Read a record in Wave Form Capture of the Metering Manager after a user request

The Wave Form Capture of the Metering Manager is file No. 5 .
This file is normally enabled (register 7132 = 0xFFFF). If not, you have to enable it by using the Command 63376 : EnFiles.
This file will record the Wave Form capture triggered
either by the Analog pre-defined alarms (1 to 53). It is therefore mandatory to configure these alarm (See the example : Configure Analog pre-defined alarm n°1)
either on user request by using the command Forcelog
This file consists of a fixed number of records (29). All records are of similar size, i.e 64 registers wide
The record of Wave Form Capture may be read using the standard read/write functions (3, 4, 6, 16, 23).
Simply follow steps. When the command is finished, the contents of the requested recording may be read starting in register 7730.
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**
b step 2 **: Forcelog**
Write the following registers by using function 16 of Modbus protocol.

Command number : 55234

Forcelog

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7720	**55234** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 8 (metering manager)
7723	P3 = 0 (0x0000) bitmap of file N° 5
7724	P4 = 16 (0x0010) bitmap of file N° 5

b step 3 **: Read Wave Form Capture characteristics (Status)**
Read the following registers by using function 3 of Modbus protocol
7151 = Actual Number of records in the log (0 or 29)
If 0, there is no record

If 29, you can read the records
b step 4 **Read Wave Form Capture recording**
Write the following registers by using function 16 of Modbus protocol.

Command number : 63178

ReadFileX_RecY

MODBUS slave	Address @ [circuit-breaker manager]
Register	**Datum to be read**
7720	**63178** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 8 (metering manager)
7723	P3 = 5 (number of the file to be read)
7724	P4 = number of the recording to be read, between 1 and 29

b step 5 : **Wait for the command being executed**

b step 6 : **Check Result code**

The requested recording may be read starting in registers **7730** (see the section *Access to the files* format of the records in the Wave Form Capture). by using function 3 of Modbus protocol.
Repeat step 4 until all the records (29) have been read.

b step 7 : **Return the flag**

Examples of commands
Manage the Fault Wave Form Capture

Read a record in the Fault Wave Form Capture of the Protection Manager after a trip condition

The Fault Wave Form Capture of the Protection Manager is file No. 22 .
This file is normally enabled (register 9964 = 0xFFFF). If not, you have to enable it by using the Command 63376 : EnFiles.
This file will record the Fault Wave Form capture triggered
by the alarms (1000 to 1038). It is therefore mandatory to actuate the log of these alarm into the FWFC (file N°22). See the example : Remotely configure and set.
This file consists of a fixed number of records (29). All records are of similar size, i.e 64 registers wide
The record of Fault Wave Form Capture may be read using the standard read/write functions (3, 4, 6, 16, 23).
Simply follow steps. When the command is finished, the contents of the requested recording may be read starting in register 7730.
Note : For the standard steps such as Request the flag, Wait for command being executed, Check result code and Return the flag, please refer to the first example of command (Send commands in protected mode) described in page 110.

b step 1 : **Request the flag**

b step 2 **: Read Wave Form Capture characteristics (Status)**
Read the following registers by using function 3 of Modbus protocol
9983 = Actual Number of records in the log (0 or 29)
If 0, there is no record

If 29, you can read the records

b step 3 **: Read Wave Form Capture recording**

Write the following registers by using function 16 of Modbus protocol.

Command number : 63178

ReadFileX_RecY

MODBUS slave Register	Address @ [circuit-breaker manager] Datum to be read
7720	**63178** (command number)
7721	P1 = 4 (total number of parameters including P1)
7722	P2 = 2 (Protection Manager)
7723	P3 = 22 (number of the file to be read)
7724	P4 = number of the recording to be read, between 1 and 29

b step 4 : **Wait for the command being executed**

b step 5 : **Check Result code**

The requested recording may be read starting in registers **7730** (see the section *Access to the files* : format of the records in the Wave Form Capture). by using function 3 of Modbus protocol.
Repeat step 3 until all the records (29) have been read.

b step 6 : **Return the flag**

Modbus protocol

For more information on the **Modbus protocol**, see the Merlin Gerin
Modbus-implementation guide :DBTP542en.pdf
Additional information available at :
http://www.modbus.org

As standards, specifications and design develop from time, always ask for confirmation of
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